CRREL TECHNICAL PUBLICATIONS

Supplement 1 January 1976 to 1 September 1986



CRREL TECHNICAL PUBLICATIONS

Supplement 1 January 1976 to 1 September 1986



Accesi	on For			
DTIC	อแกตอส	4.4,		
		^		
By C	nH	<u> </u>	- 	
Distrib			ode:	
Distrib	romani readable Avail	5 O		



US Army Corps of Engineers

Cold Regions Research & Engineering Laboratory

CONTENTS

	Page
The Cold Regions Research and Engineering Laboratory	iii
Description of CRREL technical publications	χv
Availability of publications	χv
Order form for CRREL bibliography	xix
CRREL Reports (CR)	1
Special Reports (SR)	31
Monographs (M)	57
Technical Digests (TD)	58
Miscellaneous Publications (MP)	59
Author Index	154
Subject Index	187

THE COLD REGIONS RESEARCH AND ENGINEERING LABORATORY

In nearly half the land of the Northern Hemisphere, the cold of winter freezes the earth and covers it with ice and snow. Low temperatures continue throughout the year in much of the Arctic and Antarctic, perpetually challenging the men and women who live and work there.



To adapt to the environmental conditions of these cold regions, we must fully understand their special characteristics. We must determine how the cold affects our activities and how our civilization in turn affects the cold regions. We must also learn how to adjust to the extreme changes that take place between summer and winter seasons.

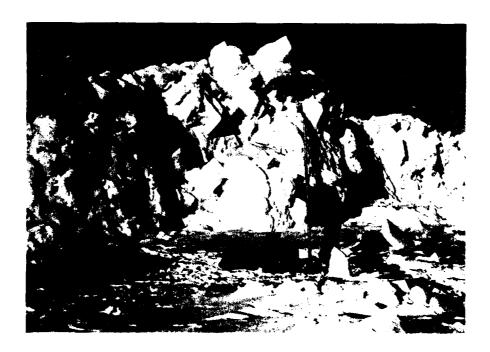
Gaining this knowledge through scientific and engineering research, and making the results available to governmental, military and other public organizations, is the job of CRREL—the Cold Regions Research and Engineering Laboratory of the U.S. Army Corps of Engineers.

THE MISSION

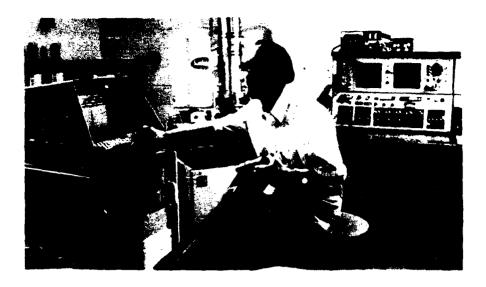
CRREL is a federal laboratory with a special mission—to understand the characteristics of the cold regions of the world and to apply this knowledge to make it easier for people to live and work there.

CRREL was created in 1961 by combining two existing Corps of Engineers organizations: the Arctic Construction and Frost Effects Laboratory and the Snow, Ice and Permafrost Research Establishment. Between them the two labs brought together at CRREL a group of research personnel with expertise in virtually all aspects of cold regions science and technology.

As a Corps of Engineers lab, CRREL has the advantage of the Corps' long-held tradition of service to the nation. CRREL research facilities and expertise are available to any federal, state or local agency that has need for them, and work has occasionally been done for private organizations as well. This approach helps to account for the diversity of research activities at CRREL and the overall character of the laboratory. Each research or study project, whether funded by the Corps of Engineers or other agencies, has a well-defined scope and objective chosen by its sponsor.



Sonar profiling of pressure ridge keel in Beaufort Sea.



Scanning electron microscope

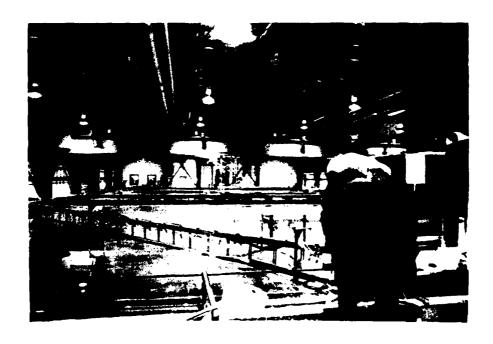
CRREL PERSONNEL AND FACILITIES

Cold regions science and technology is a specialty that cuts across traditional disciplinary lines. As a result, the CRREL staff is quite diverse, with specialists from many different backgrounds. The total staff numbers about 300, including more than 100 research scientists and engineers. These researchers include civil, hydraulic, electrical, chemical and mechanical engineers, and agronomists, biologists, chemists, geographers, geologists, geophysicists, glaciologists, meteorologists, physicists and soil scientists. In addition, scientists and engineers from other institutions often pursue long-term research projects at the laboratory.

The support staff at CRREL also comprises a variety of professionals. Administrators, support engineers, technicians, computer specialists, photographers, illus-



Instrumentation in vehicle for measuring mobility through snow



Model of ice control structure in Ice Engineering Facility

trators, editors, typesetters, secretaries and dozens of others help to keep the laboratory running smoothly. These personnel often bring their expertise outside CRREL when needed for the research projects of other organizations.

The physical facilities that support the CRREL research effort really merit the description "unique." The main laboratory building contains 24 coldroom laboratories, many capable of achieving temperatures of -30 °C or below. Along with the cold laboratories are chemistry, physics, soils and electronics labs with highly specialized equipment for research at below-freezing temperatures.

In 1978 an Ice Engineering Facility was completed that is devoted to the study of problems caused by ice in waterways. This lab, acclaimed as the finest in the world, permits research that will lessen the effects of winter on the nation's waterways. In the Ice Engineering Facility is a refrigerated modeling area in which scaled-down rivers, harbors and lakes can be studied, a tilting refrigerated flume for river ice research, and a large test basin in which ice force problems can be studied at nearly full-scale dimensions.

The Frost Effects Research Facility, completed in 1985, is be devoted to the study of frost action in soils. This laboratory contains refrigerated research areas for below-freezing testing of pavements, foundations and underground utilities, and permits the study of destructive freeze-thaw cycles in a controlled setting.

CRREL also has an Alaskan Projects Office at Fairbanks with a research and supporting staff to aid in conducting CRREL's many projects in Alaska. In Fox, Alaska, CRREL excavated and helps to maintain a research tunnel in permafrost, the only facility of its type in the Western World.

CRREL RESEARCH

Snow and ice

Basic to the understanding of the cold regions is the study of snow and ice. Because they change with the characteristics of their environment, snow and ice are far more complex than most people realize.





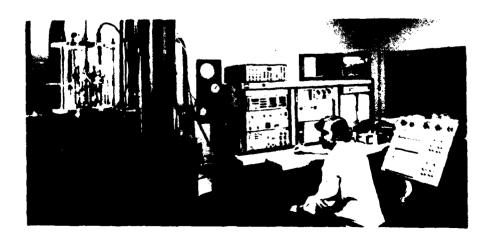
Drilling through ice in Antarctica

Examining an ice core

CRREL scientists and engineers have extensively studied both freshwater ice and sea ice. They have extracted drill cores from ice caps, icebergs and sea ice floes to scrutinize them with a number of analytical methods. Crystalline structure, which can greatly affect strength characteristics, has been investigated microscopically and with specialized radar devices. The minute quantities of certain elements in ice cores have been determined to the precision of 1 part per billion, and electron micrographs have revealed trace particles in snow crystals under thousands of powers of magnification.

The accumulation of ice on helicopter blades, ship superstructures, and communications antennas is a problem that has received considerable attention. CRREL researchers have explored the basic mechanisms that cause the ice accumulation and have developed methods for its prevention.

Ice can be a source of support for buildings, vehicles and machinery placed over water bodies or on glacial ice. But ice can also be a source of destruction when sheets of sea ice crush against navigation structures or river ice smashes against bridges. To



Strength testing machine

make use of its positive aspects and to guard against its destructive effects, the engineering properties of ice must be thoroughly known. Strength testing of ice samples and the measurement of ice forces on instrumented structures has revealed much information about the basic properties of different types of ice.

Snow also takes many different forms, depending on temperature, age, and snow-pack pressure. In glaciers, snow is transformed by the pressure of the accumulating snowpack first into a consolidated substance called firn and then eventually into ice. The massive ice sheets—such as those in Greenland and Antarctica—were formed in this way, and examination of the drill cores has revealed thousands of years of climatic history.

Research on mountain glaciers has helped to explain the forces that were working thousands of years ago when much of the Northern Hemisphere was covered with ice. The accumulation and breakup of the massive Antarctic glaciers have been carefully studied, as any fluctuation could drastically affect the global climate and the level of the world's oceans. Even the effects of the eruptions of Mt. St. Helens on its glaciers have been observed by CRREL scientists.

Melting of snow and the subsequent runoff are important to flood control and hydroelectric power production. Predictive models developed for estimating snowmelt and runoff have compared favorably with results from test sites. Eventually this work may result in accurate methods of predicting the amount and rate of spring runoff into watersheds throughout the country.

Frozen ground

Along with snow and ice, the other major natural material in cold regions is frozen ground. This material is even more complex, as it can take a multitude of forms. In the Far North, permanently frozen ground or permafrost is of particular concern because ice-rich permafrost will melt and settle if seriously disturbed. In virtually all areas with subfreezing temperatures, frost heaving can be a very destructive force to roads, airfields, pipelines, and all types of foundations.

An extensive effort has been made to understand the basic mechanisms of frost heaving so that this phenomenon can be reliably predicted. Although heaving can be



Installing a temperature-monitoring system in ground along trans-Alaska pipeline haul road

prevented by placement of soils that permit sufficient drainage, these soils are becoming increasingly scarce and expensive in many areas. Special techniques, such as surrounding problem soils with water-resistant membranes and precisely classifying soils with marginal frost susceptibility, promise to reduce both construction costs and potential for frost damage.

As with snow and ice, the mechanical properties of permafrost and seasonally frozen ground must be well understood before construction on these materials can take place. A number of laboratory and field tests have been devised to determine the moisture content and the frost-susceptibility of soils. In permafrost regions, an extensive program has sought to determine the ground ice content at substantial depths by electromagnetic methods and core drilling. CRREL researchers have helped to discover the characteristics of the permafrost beneath the Beaufort Sea near the oil fields at Prudhoe Bay, Alaska.

Cold regions construction

Among CRREL's first accomplishments was the design of airfields and living facilities in Greenland and Antarctica. This emphasis on cold regions construction has actively continued since that time. Major accomplishments have been the moving of a 3300-ton DEW Line station in Greenland onto a new and more stable foundation, and assistance in preparing design and installation procedures for the thousands of piles that support the aboveground portions of the trans-Alaska pipeline.

The design of roads and airfields has received particular emphasis. Experimental roads in New Hampshire and Alaska have tested new building techniques for cold regions. A study of the "haul road," built to bring materials to construction sites along the trans-Alaska pipeline, has shown the 360-mile-long road's response to the harsh northern climate and its effects upon the surrounding environment. In remote areas of Alaska, construction of airfields that are insulated from the permafrost has prevented disturbance of the ground ice and deterioration of the tundra.



Measuring movement of trans-Alaska pipeline



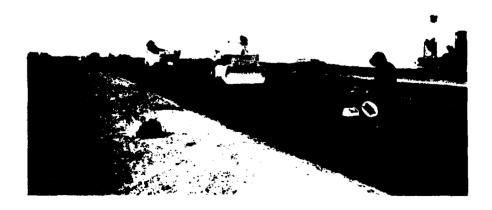
Air-transportable shelter

CRREL engineers have designed an air-transportable shelter for use in severe cold regions, and have conducted a long-term program on the correct design of roofs in heavy snowfall areas. From an extensive statistical analysis, a method of estimating roof snow loads for any area in the United States has been developed. In one application of their expertise, CRREL engineers determined the roof load at the time of the collapse of the huge roof of the Hartford, Connecticut, Civic Center.

Other CRREL construction-related research has investigated the use of special asphaltic paving mixtures and concretes that can be placed at low temperatures. Blasting techniques for use in permafrost and on ice have been developed. And CRREL engineers have worked with several agencies in remedying the detrimental effects of cold weather on existing facilities. In particular, one program found better ways to repair potholes in northern roads.

Land transportation

In areas where no roads exist or where they are clogged with snow, land transportation with conventional vehicles can be extremely difficult or virtually impossible. This problem has been addressed in two ways. First, methods are being developed for predicting the performance of wheeled and tracked vehicles in snow so that their design can be improved.



Laying asphalt concrete at Deadhorse Airfield, near Prudhoe Bay, Alaska

A second approach was a study of the use of surface-effect vehicles ("hovercraft") in arctic regions. These vehicles, modified for arctic use, were found to work well over snow-covered tundra, and they had little effect on the underlying permafrost.

Environmental protection

Due to the instability of ice-rich permafrost and the short growing season in northern regions, environmental protection is crucial. Several CRREL researchers have taken part in studies of the climate and biology of northern Alaska that are providing the first detailed documentation of this environment.

The impact of civilization has also been closely monitored. A long-term study has shown the effects of artificial oil spills on vegetation in a controlled environment, and the clean-up methods for spills along the trans-Alaska pipeline have been carefully observed to determine their effectiveness.

Restoration of areas damaged by construction activities has been documented and strategies developed to speed recovery. CRREL scientists have monitored erosion control and restoration activities along the entire trans-Alaska pipeline and on test slopes in New Hampshire and Alaska. Procedures for mapping wetlands through aerial photography and satellite imagery are being developed as part of a nationwide Corps of Engineers land use inventory. Similar remote sensing methods have assessed shore erosion in the Great Lakes and at Cape Cod and determined the potential environmental impact of construction projects in Alaska and northern Maine.

A multinillion dollar research program on improving methods for the land treatment of wastewater has been completed. Land treatment renovates municipal wastewater in a scientifically controlled manner to maximize the removal of waste substances and to minimize environmental effects and energy costs. The land treatment research program has placed this new technology on a firmer engineering basis so that millions of dollars will be saved in the construction and operation of new systems.



Sampling wastewater applied to a land treatment system



Blasting an ice jam.



High flow bubbler system (foreground) to keep ice from entering lock

Ice engineering

CRREL's Ice Engineering Facility has already been used in a variety of ways to improve winter navigation in cold regions. Studies of model icebreakers, conducted in the large refrigerated test basin, have resulted in devices that keep ice from damaging the ships' propellers. Studies of the interaction of moving ice sheets with test structures have helped to explain the destruction of offshore navigation facilities and to formulate new designs.

Refrigerated flume studies have resulted in methods for minimizing ice accumulation at dams and water intakes. Large-scale modeling of ice control structures in the Ice Engineering Facility's research area has demonstrated how existing structures can be modified and new ones designed to help protect shipping in ice-clogged northern rivers. As ice jams cause serious flooding each year in northern communities, the mechanics of ice jamming have received considerable attention so that this phenomenon can be prevented or controlled.

Various methods of keeping navigation locks free of ice have been devised to help extend the navigation season of the upper Ohio River system and St. Lawrence Seaway. The development of underwater air bubblers to keep navigation channels open has been applied extensively in northern harbors and navigation facilities.

Energy conservation

Due to the large heating requirements of buildings in cold regions, several projects have focused on conserving energy while maintaining comfortable living conditions. Infrared sensing devices have been used extensively to detect heat losses and wet in-



Checking heat flow data

sulation. From these infrared surveys, recommendations can be made as to how to most cost-effectively improve the thermal performance of a building's walls and roof.

Heat pumps for reclaiming waste heat from industrial cooling water have been studied and used to heat two buildings at CRREL. A method of analyzing the thermal losses from heat distribution systems has helped to maximize the efficiency of centralized heating systems, and a project in Alaska has assessed the use of waste heat for improving agricultural production in the Far North.

Military operations

To aid the Army in preparing for military action in cold regions is one of CRREL's continuing concerns. Field tests have shown that snow fortifications can be used for stopping small arms fire, and an extensive program has contributed to the design of a baseplate for a lightweight mortar.

Currently, CRREL is coordinating extensive tests on the effects of winter weather on the electro-optical guidance systems used in modern weapons. The test program will lead to an understanding of the performance of these systems during heavy snowfall and other adverse weather conditions. Another program is examining the effects of the cold regions environment on land mines.



Mine sensitivity test



CRREL library

TECHNICAL INFORMATION

Since scientific and technological research depends on the effective transfer of information, CRREL has a very active publication program. CRREL publishes approximately 100 technical reports each year, along with a general-interest newsletter. In addition, CRREL maintains a current international bibliography of available cold regions publications entitled the *Bibliography on Cold Regions Science and Technology*. Approximately 140,000 publications have been accessioned to date. New CRREL publications are listed in the laboratory's information bulletin and in a cumulative annual supplement. The results of many CRREL investigations are also published in professional journals.

The CRREL library maintains an extensive collection of material on cold regions science and technology. The library is open to the public and welcomes requests from other organizations for information about cold regions technical literature.

All CRREL publications can be obtained from the National Technical Information Service, Springfield, Virginia, 22161. Some are available directly from the CRREL Publications Office. For general information about the laboratory, contact CRREL's Public Affairs Office at the following address:

USACRREL
72 Lyme Road
Hanover New Har

Hanover, New Hampshire 03755

Telephone: 603-646-4292

(Autovon 684-4292)

CRREL welcomes requests from other organizations for assistance with cold regions problems. These requests will be forwarded to the engineer or scientist who specializes in the specific problem area.

DESCRIPTION OF CRREL TECHNICAL PUBLICATIONS

Bibliography on Cold Regions Science and Technology

The Bibliography on Cold Regions Science and Technology was first published in 1951 and is a continuing publication of the Cold Regions Bibliography Section of the Library of Congress. It is sponsored by and prepared for CRREL. Volumes 1-15 were issued as the Bibliography on Snow, Ice and Permafrost, SIPRE Report 12. Beginning with volume 16 the title was changed to Bibliography on Snow, Ice and Frozen Ground, with Abstracts, and with volume 23 the current title was adopted.

Nearly all of the literature cited in the Bibliography on Cold Regions Science and Technology has been placed on microfiche and is available from the Library of Congress or CRREL library. Those interested in purchasing a photocopy of documents cited should address their request to: The Library of Congress, Photo Duplication Service, Dept. C-177, 10 First Street S.E., Washington, D.C. 20540. A complete bibliographic citation should be given. Online search of the Bibliography on Cold Regions Science and Technology (File Cold) is offered by

ORBIT Search Service 8000 Westpark Drive McLean, VA 22102 703-442-0900 800-421-7229 FAX: 703-893-4632

Collect calls from Canada accepted.

You may contact the CRREL library for additional information.

Current Literature—Cold Regions Science and Technology

Current Literature is also prepared for CRREL by the Cold Regions Bibliography Section of the Library of Congress. All CRREL reports and outside publications are announced as published. The 12 monthly listings are proofed, cumulated and published along with indexes each year as the Bibliography on Cold Regions Science and Technology.

CRREL Reports

The results of all major research efforts at CRREL are published in the CRREL Report series.

Special Reports

The Special Report series contains a wide variety of types of reports that do not fall within the CRREL Report category, e.g. literature reviews, data compilations, interim reports.

Monographs

The Cold Regions Science and Engineering Monograph series comprises comprehensive reviews of a field of scientific or technical knowledge with analysis and evaluation.

Miscellaneous Publications

This series chiefly includes papers by CRREL authors that are published outside the laboratory (e.g. journal articles, conference papers, reports published by other agencies.)

Internal Reports and Technical Notes

The Internal Report series contains documents that have not been published for reasons such as excessive expense, limited interest, etc. Copies are available for review in the CRREL library. Technical Notes are informal, preliminary, unreviewed papers that are not intended for external distribution.

AVAILABILITY OF PUBLICATIONS

Most CRREL reports are announced as published in *Government Reports Announcements*, a semi-monthly abstract journal. They are available from the National Technical Information Service (NTIS), Springfield, VA 22161. The telephone number is 703-487-4650.

HOW TO ORDER

Three categories of order fulfillment are offered.

1. Rush Handling (replaces "Rush Order") is for customers who must have immediate delivery.

Rush Handling guarantees that a particular order will be filled within 24 hours of receipt. Rush Handling orders receive immediate validation, verification of availability, and individual hand processing through inventory control and the warehouse; priority printing if reproduction from film is required, and priority mailing.

Rush Handling orders for mailing rather than pickup are accepted only from customers having NTIS Deposit Accounts or American Express, Visa, or MasterCard Accounts.

Rush Handling orders may be placed only by telephone, telegram, Telex, Telecopier or customers in person; not by mail. Customers must use order numbers.

Rush Handling for delivery to customers by First Class Mail adds \$10 to the cost of each item or copy ordered.

Rush Handling for pickup in Springfield or D.C. adds \$7.50 to the cost of each item or copy ordered.

The Express/Rush phone number is 800-336-4700 or 703-487-4700.

2. Premium Service is a day and night toll-free telephone ordering procedure ensuring order processing and mailing within 4 to 9 days to NTIS Deposit Account or American Express, Visa or MasterCard customers. The \$3.50 fee for each item is waived if the order is not mailed within the specified period. Customers must use order numbers. Titles alone cannot be accepted in this procedure.

All Deposit Account, American Express, Visa, and MasterCard customers receive *Premium Service* identification numbers with which they may place telephone orders at any time. *Premium Service* benefits are toll-free calls with 24-hour availability, no busy signals, simplified ordering techniques (details with the identification number), postage savings and priority delivery.

Premium Service adds \$3.50 to the cost of each item ordered.

- 3. Regular Service will continue to operate with improved processing and stocking methods, optional priority mail delivery (\$3 North America; \$6 outside) and optional pickup in Springfield or D.C. Current parcel post deliveries using the U.S. Postal Service are completed within 9 to 30 days.
- 4. Online Ordering. The commercial vendors of the NTIS Bibliographic Data Base are experimenting with the convenience of online ordering of NTIS documents for their customers. Currently, online ordering is offered by the Systems Development Corporation (SDC). It permits SDC customers to charge their NTIS Deposit Accounts for orders that are transmitted daily to NTIS. Inquiries should be addressed to SDC, 2500 Colorado Avenue, Santa Monica, California 90406.
- 5. Telex. Ordering from NTIS may be speeded by the use of Telex. Customers may charge their Deposit Accounts, credit cards or ask for Ship & Bill Service. Ship & Bill Service costs \$5 extra for each order. The Telex number is 89-9405.
- 6. Orders for Foreign Destinations should be made through the sales agencies for NTIS products. Only if there is no sales agency in your country, should you order directly from NTIS.

For more information

For information not covered by the order form, please direct your inquiry to Customer Services, NTIS, 5285 Port Royal Road, Springfield, VA 22161; or Telephone (703) 487-4600 or (202) 724-3382.

HOW TO PAY

The prices in this catalog cover sales in the United States, Canada and Mexico. Buyers for foreign designations should request separate pricing.

The fastest service is provided to customers who charge against their NTIS Deposit Accounts or their American Express, Visa or MasterCard accounts, because the processing of such orders is simplest for NTIS. Holders of NTIS Deposit Accounts may replenish their accounts using the above credit cards. And new Deposit Accounts may be opened in the same manner.

Otherwise, payment by check or money order must accompany each order.

As an added convenience to customers who have established credit, a Ship and Bill Service is provided generally at a \$5 surcharge on each total order for documents, regardless of the number of documents ordered.

Retail Sales at Two Locations

NTIS has two retail sales locations in the Washington area.

In the District of Columbia, the NTIS Information Center and Bookstore is in the Pennsylvania Building, Suite 620, 425 13th Street N.W. Telephone (202) 377-0365. Several hundred best selling titles are displayed for sale and for immediate delivery without Rush Handling surcharge.

The Springfield Operations Center has a much more limited display of research reports, but any titles may be ordered for future delivery.

Prices for most reports are \$6.50 microfiche, \$9.95 Xerox copy.

How to Open a Deposit Account

Use the order form and send at least \$25, or enough to cover your first order, to NTIS Deposit Account, 5285 Port Royal Road, Springfield, VA 22161. Thereafter, keep at least \$25 on deposit or enough to cover two months' charges. Orders will not be processed for overdrawn accounts. You may deposit any amount prior to ordering. Some active customers keep several thousand dollars in their accounts to ensure the fastest possible service for large orders.

When your account is opened, you will receive preaddressed order forms to speed your shipments and simplify accounting and the recording of tax-deductible expenses.

NTIS FOREIGN REPRESENTATIVES

NTIS is represented in many countries around the world by local organizations. These representatives assure NTIS clients in those countries of fast and efficient service when transacting business with NTIS. They offer the convenience of accepting payment in local currencies and they can solve any order-related problem. These represen-

tatives also locate foreign technology for the NTIS collection.

NTIS customers in the countries listed should direct their orders and inquiries to the designated representatives.

NTIS foreign prices usually apply in countries other than the United States, Canada and Mexico. But, by special arrangement with the NTIS representatives in certain developing countries the North American price may apply. Customers ordering for destinations outside of the United States, Canada and Mexico may request the free current NTIS Foreign Price List (NTIS-PR-360-4), or ask for the specific foreign price of any product or service.

ORDER FORM for Bibliography on Cold Regions Science and Technology MAIL ORDER TO:

CRREL-TI

72 Lyme Road

Hanover, N.H. 03755-1290

SHIP TO: (Enter if different from address at left.)					
NAME					
ORGANIZATION					
STREET					
CITY, STATE, ZIP					
☐ Check enclosed for \$					
Checks must be made payable to "F&AO, USA					
NRDC," and must be in U.S. currency from a					
U.S. bank.					

Signature

Publication date	Coverage	Volume	NTIS order number	Paper copy	Micro- fiche	Quantity	Unit price	Tota
0	CID + 201		1 D 405005				***	
Sept 1951	SIP 1-781	1	AD 495995				\$40.00	
July 1952	SIP 781-2400	2	AD 495996				40.00	
Jan 1953	SIP 2401-4000	3	AD 11941				40.00	
July 1953	SIP 4001-5500	4	AD 23334				40.00	
Jan 1954	SIP 5501-7000	5	AD 29227				40.00	
July 1954	SIP 7001-8500	6	AD 42727				40.00	
Jan 1955	SIP 8501-10,000	7	AD 57394				40.00	
July 1955	SIP 10,000-11,500	8	AD 99684				40.00	
Jan 1956	SIP 11,501-13,000	9	AD 99685				40.00	
July 1956	SIP 13,001-14,000	10	AD 115158				40.00	
Jan 1957	SIP 14,001-15,000	11	AD 139463				40.00	
Jan 1958	SIP 15,001-16,000	12	AD 158195				40.00	
Jan 1959	SIP 16,001-17,000	13	AD 217715				40.00	
Jan 1960	SIP 17,001-18,000	14	AD 255775				40.00	
Jan 1961	SIP 18,001-19,000	15	AD 277537				40.00	
Jan 1962	SIP 19,001-20,000	16	AD 278593				40.00	
June 1963	SIP 20,001-21,000	17	AD 432809				40.00	
June 1964	SIP 21,001-22,000	18	AD 447121				40.00	
June 1965	SIP 22,001-23,000	19	AD 621041				40.00	
June 1966	SIP 23,001-24,200	20	AD 641116				40.00	
June 1967	SIP 24,201-25,200	21	AD 658229				40.00	
June 1968	SIP 25,201-26,000	22	AD 672756				40.00	
Dec 1983	SIP 1-26,000	Cum. Subj. &	ADA 147763				40.00	
		Auth. Index Vol. 1-22						
July 1969	23-1 to 23-5949	23	AD 696404				40.00	
July 1970	24-2 to 24-4014	24	AD 715769				40.00	
July 1971	25-1 to 25-4385	25	AD 740201				40.00	
Sept 1972	26-1 to 26-4025	26	AD 752083				40.00	
July 1973	27-1 to 27-3104	27	AD 768099				40.00	
Dec 1973		Cum. Subj. & Auth. Index Vol. 23-27	AD A022642				40.00	
July 1974	28-1 to 28-4320	28	AD A007092				40.00	
Oct 1975	29-1 to 29-4032	29	AD A022640				40.00	
Dec 1976	30-1 to 30-4635	30	AD A083016				40.00	
Dec 1977	31-1 to 31-4544	31	AD A063686				40.00	
Dec 1978	32-1 to 32-4772	32	AD A083017				40.00	
Dec 1978		Cum. Subj. & Auth. Index	AD A083015				40.00	
		Vol. 28-32						
Dec 1979	33-1 to 33-4770	33	AD A097639				40.00	
Dec 1980	34-1 to 34-4255	34	AD A102357				40.00	
Dec 1981	35-1 to 35-4342	35	AD A115954				40.00	
Dec 1982	36-1 to 36-4268	36	ADA134620				40.00	
Dec 1983	37-1 to 37-4389	30 37	ADA 149148					
Dec 1983	31-1 to 31-4307	Cum, Subj. &	ADA 149148 ADA 149147				40.00 40.00	
DCC 1783		Auth. Index Vol. 33-37	ADA 147147				40.00	
Dec 1984	38-1 to 38-4596	38 & Index	ADA 154638				40.00	
Dec 1985	39-1 to 39-4069	39	ADA 173543					
	37 . 10 37 4007	39 Index	ADA 1733474				40.00	
Dec 1986	40-1 to 40-4788	40	INDIA LIGHT					
Dec 1700	70-1 (0 70-7/00	40 Index					40.0	

ORDER FORM for Mountain Glaciers of the Northern Hemisphere, by W.O. Field

Vol 1 (704 pp.) Vol 2 (932 pp.) Atlas (49 maps) ADA 014532

40.00

CRREL REPORTS

CR 76-01

ARCTIC ENVIRONMENT AND THE ARCTIC SURFACE EFFECT VEHICLE. Sterrett, K.F., Jan. 1976, 28p., ADA-024 849, Bibliog-

raphy p.25-28. 31-4161

AIR CUSHION VEHICLES, SEA ICE, TOPO-GRAPHIC FEATURES, ARCTIC LANDSCAPES. GRAPHIC FEATURES, ARCTIC LANDSCAPES. This report summarizes the advances in understanding of the Arctic which have come about since the inception of the ARPA Arctic Surface Effect Vehicle Program in 1970, primarily as the result of CRREL's participation. Major efforts to increase knowledge of sea ice, terrestrial, and coastal topographic features are described. Special emphasis is placed upon the quantitative understanding of pressure ridging. Other areas of major interest are atmospheric characteristics and ecological effects. A list of publications generated is included.

PROTECTED MEMBRANE ROOPS IN COLD

Aamot, H.W.C., et al, Mar. 1976, 27p., ADA-025 226, 32 refs.

Schaefer, D. 31-4162

WATERPROOFING, INSULATION, ROOFS. COST ANALYSIS.

COST ANALYSIS.

Protected membrane roofs have the prerequisites for better performance and the experience to date is encouraging. The results of performance measurements of three roofs built by the Corps of Engineers verify that the mambrane remains at nearly constant temperature, independent of the weather, and that the insulation retains its integrity despite periodic wetting. Moisture absorption is slow and appears to stabilize in time due to the self-drying nature of the roof. Heat closes are increased due to rain, and extra insulation should be added to compensate for these losses. The resistance of protected membrane roofs to fire, traffic, impact, and other adverse forces is superior. So far, the initial cost of protected membrane roofs is at a premium, primarily due to the cost of concrete pavers. The initial cost premium can be justified, however, by the reduced repair and maintenance costs as indicated to date, and by the longer life expectancy of the protected membrane. The high probability of superior performance and cost effectiveness is a compelling reason to incorporate protected membrane roofs increasingly in Government construction. in Government construction.

CR 76-03

SURVEY OF DESIGN CRITERIA FOR HAR-BORS AND CHANNELS IN COLD REGIONS AN ANNOTATED BIBLIOGRAPHY.

Haynes, F.D., Mar. 1976, 32p., ADA-025 226. 31-4163

BIBLIOGRAPHIES, PORTS, CHANNELS (WA-TERWAYS), ICE LOADS, DESIGN CRITERIA.

A world-wide review of the literature applicable to the design of harbors and channels in cold regions was conducted. Forces due to ice movement present the dominant factor in the design of marine structures in cold regions. Expressions for calculating the ice force are presented. Other factors relating to design criteria such as construction materials, structure geometry, and methods of ice suppression are discussed.

ISLANDS OF GROUNDED SEA ICE.

Kovacs, A., et al, Apr. 1976, 24p., ADA-025 257, 26 refa.

Gow, A.J., Dehn, W.F.

31-4164

SEA ICE, ICE ISLANDS, SPACEBORNE PHO-TOGRAPHY.

TOGRAPHY.

Large areas of grounded sea ice have been reported by early arctic explorers and more recently by the U.S. Coast Guard. The ESSA, EPTS, NOAA and DMSP satellites now provide multispectral imagery with sufficiently high resolution to allow detailed sequential observations to be made of the movement and spatial extent of arctic sea ice. This report discusses the location, formation and decay of five large (> 30 aq km) islands of grounded sea ice in the southern Chukchi Sea as observed for an extended period of time using satellite imagery. Measurements of the bathymetry around one grounded sea ice feature are presented along with observations made and photos taken from the ice surface. The potential use of these sea ice islands as research stations is also discussed.

CR 76-05

INTERPRETATION OF THE TENSILE STRENGTH OF ICE UNDER TRIAXIAL STRESSES.

Nevel, D.E., et al, Apr. 1976, 9p., ADA-027 042, 12

Havnes, F.D.

ICE STRENGTH, TENSILE STRENGTH, THEO-RIES, STRESSES

Griffith, and later Babel, have previously developed a tens fracture criterion for a two-dimensional state of stress. The Griffith, and later paper, have previously developed a temperature criterion for a two-dimensional state of stress. This theory is extended to the compression-compression region. From this theory the angle of fracture is developed. The theory is extended conceptually to three dimensions. al test data by Haynes for anow-ice are shown in this three-dimensional fracture theory. The test data are slightly less than those predicted when the void in the snow-ice is substricted.

WATER FLOW THROUGH VEINS IN ICE. Colbeck, S.C., Apr. 1976, 5p., ADA-026 631, 8 refs.

GLACIERS, WATER FLOW, WATER PRESSURE. POROUS MATERIALS.

POROUS MATERIALS.

Water flow through the vein structure of temperate ice is described as Darcian flow in which the pressure gradient is determined from vein size and overburden pressure. A solution method for the resulting equation is given and two special cases are considered. For steady flow the equilibrium vein size is a function of depth and, by neglecting the effects of diffusion, it is shown that flow perturbations introduced at the surface propagate downward at a constant speed. These perturbations propagate so slowly that even annual surface fluctuations of flow may be eliminated by diffusion before reaching the bottom of the glacier.

CANTILEVER BEAM TESTS ON REINFORCED

Ohstrom, E.G., et al, Apr. 1976, 12p., ADA-025 380, 6 refs.

DenHartog, S.L.

31-4167 ICE STRENGTH, ICE ROADS, PLOATING ICE. REINFORCEMENT (STRUCTURES).

REINFORCEMENT (STRUCTURES).

To determine the effectiveness of reinforcement in ice roads or other uses of a floating ice sheet a series of in-situ cantilever beam tests were run in both seawater ice and neahwater ice. Tests were run using 1-in-diameter tree branches, 3/16-in-diameter wire rope and 9/16-in-half-round wood dowels. The tests demonstrated clearly that properly placed reinforcement increases the bending strength of the ice and showed further that reinforcement reduces the chances of equipment loss. The question of whether to reinforce or simply grow a thicker ice sheet has not been addressed as this is more a problem of local economics.

CR 76-08

PREDICTION OF UNFROZEN WATER CON-TENTS IN FROZEN SOILS FROM LIQUID DETERMINATIONS.

Tice, A.R., et al, Apr. 1976, 9p., ADA-026 632, 30

Anderson, D.M., Banin, A.

31-4168 SOIL WATER, UNFROZEN WATER CONTENT. 31-4168
SOIL WATER, UNFROZEN WATER CONTENT.
During the past decade a number of methods for measuring the amount of unfrozen water in partially frozen ground have emerged. Means of quickly and simply predicting unfrozen water contents in clay have become increasingly important with the growth of interest in encapsulating clay soils compacted at low water contents to serve as base courses for roads. Unfortunately the measurements require sophisticated equipment and, in most instances, specially trained operators. In an effort to simplify the task of obtaining water-ice phase composition data, methods of calculating phase composition curves from other, simpler measurements on soils have been acught. In this paper we present a method of deriving the measurement of unfrozen water contents at various temperatures from liquid limit determinations. Previous studies have indicated that phase composition curves can be well represented by a simple power equation, W sub u = alpha x theta sup beta, where W sub u is the unfrozen water content in g H20/g soil, theta is the temperature in degrees below freezing and alpha and beta are empirical constants characteristic of a given soil. When the liquid limits of a large group of soils encompassing a wide range of textures were regressed against values of alpha, the correlation was found to be remarkably good. This has permitted the development of a prediction equation of sufficient accuracy for general engineering use. CR 76-09

SITE ACCESS FOR A SUBARCTIC RESEARCH

Slaughter, C.W., Apr. 1976, 13p., ADA-026 624, 9 refa

31-4169

RESEARCH PROJECTS, REMOTE SENSING. SITE ACCESSIBILITY.

Access to study areas may be an important factor in long-term field-oriented research, particularly in regions without well-developed road and communications systems. In a well-developed road and communications systems. In a wildland hydrometeorology research project in subarctic Alaska, access to and within a 40-aquare-mile research watershed has been developed both in accordance with a general plan prepared at project inception and in response to developing research requirements. Foot trails, trails for "off-road" low-ground-pressure tracked vehicles, helicopter transport, long-term data recorders, and radio telemetry of data have all heen incorporated in an access and communications anates. all been incorporated in an access and communications system Cost estimates indicate that incorporation of gravel roads into the system would be economically advantageous, given adequate funding for initial road construction.

DE-ICING USING LASERS.

Lane, J.W., et al, Apr. 1976, 25p., ADA-026 637, 27 refa

Marshall, S.J.

31-4170 ICE REMOVAL, LASERS, STRUCTURES, DAM-AGE.

The feasibility of employing a laser to de-ice remote surfaces was investigated. A Nd:Glass laser, wavelength 1.06 micrometers, and a Ruby laser, wavelength 6943A, were used to irradiate ice grown upon six types of substrates - asphalt, brass, concrete, aluminum, steel, and stone. It was found that a single pulse, delivered to the interface between the ice and its abstrates a surface that the state of the a single pulse, delivered to the interface between the ice and its substrate at a power density of 100 million to 1 billion watts/cm2, produced fractures 0.1 to 2 cm in diameter for all substrates. If the initial fracture could be propagated by suitable scanning of the optical beam over the interface, the ice could be disrupted and thus removed from the substrate. The technique could also be a useful adjunct to de-icing methods that depend upon the existence of an initial crack. The process of producing the initial fracture was found to be limited by the thickness of the ice, the bubble content of the ice, and the focusing susten.

CR 76-11

EFFECTS OF RADIATION PENETRATION ON

SNOWMELT RUNOFF HYDROGRAPHS. Colbeck, S.C., Apr. 1976, 9p., ADA-025 763, 10 refs. For this report from another source see 31-4211. 31-4171

HYDROLOGY, RUNOFF, RADIATION ABSORPTION.

ABSORPTION.

Water flow through the unsaturated portion of a snowpack is calculated using various assumptions about radiation penetration into the snow. The results show that for the purposes of hydrologic forecasting, it is sufficiently accurate to assume that all of the radiation absorption occurs at the surface. The error in the calculation of flow is largest for very shallow snowpacks, but this error is reduced by radiation absorption at the base of the snow and by the routing of meltwater through the saturated basal layer.

HEAT TRANSFER CHARACTERISTICS OF MELTING AND REFREEZING A DRILL HOLE THROUGH AN ICE SHELF IN ANTARCTICA. Yen, Y.-C., et al, Apr. 1976, 15p., ADA-026 365, 3 refs.

Tien, C 31-4172

HEAT TRANSFER, BOREHOLES, ICE SHELVES, ICE MELTING, RÉGELATION.

The heat transfer processes associated with melting and refreezing a drill hole 500 m in depth and 0.150 m in initial radius through an ice shelf were approximately analyzed. The results were expressed in graphical form showing the time available for experimentation under the hole as a function of heating duration and heating strength. It was found that the refreezing of the drill hole had a much slower rate than the melting of the hole. (Auth.)

WINTER THERMAL STRUCTURE AND ICE CONDITIONS ON LAKE CHAMPLAIN, VER-MONT

Bates, R.E., June 1976, 22p., ADA-027 146, 9 refs.

LAKE ICE, THERMAL REGIME, ICE CONDI-TIONS, MEASURING INSTRUMENTS, UNITED STATES-VERMONT-LAKE CHAMPLAIN.

The thermal structure and ice conditions of Lake Champlain, a mid-latitude large lake, near Shelburne Point, Vermont, were studied during the winter of 1974-75. The lake was instrumented to a depth of 8.5 m with a string of highly calibrated thermistors, connected to a data logger highly calibrated thermistors, connected to a data logger on above which recorded water temperatures every four hours. An ice mooring system was developed to anchor the thermistor string so that ice and water temperatures could be obtained at known levels. This temperature recording system measured vertical and horizontal variations in ice and water temperature regimes during ice formation, growth and decay. Meteorological data were measured during the winter period November 1974 through March 1975 at the site. Ice stratigraphy was determined for the ice at the site at its maximum seasonal growth for comparison with ice from St. Albans Bay (at the northern end of Lake Champlain) which had formed earlier. Correlations were determined had between ice growth and accumulated degree days of freezing. The operation of a bubbler system installed near the measurement site around a service dock was observed.

CR 76-14 THERMAL POLLUTION STUDIES FRENCH CREEK, EIELSON AFB, ALASKA. McFadden, T., June 1976, 5p., ADA-027 405, 7 refs.

THERMAL POLLUTION, WATER POLLUTION,

IHEMMAL POLLUTION, WATER POLLUTION, UNITED STATES—ALASKA—EIELSON AFB. At the height of warm weather in Alaska in 1975, temperature measurements were made to determine the extent of the thermal impact on Prench Creek due to a condenser cooling water impact from the Bielson AFB Power plant. Water temperature measurements during a two-day period failed to show any significant thermal impact on the water in Prench Creek. It was concluded that no thermal pollution exists due to this warm water input at the volumes and conditions that presently exist.

REVEGETATION IN ARCTIC AND SUBARCTIC NORTH AMERICA—A LITERATURE REVIEW. Johnson, L.A., et al, June 1976, 32p., ADA-027 406, Bibliography p.22-28. Van Cleve, K. 31-4175

PLANTS (BOTANY), ARCTIC LANDSCAPES SUBARCTIC LANDSCAPES, REVEGETATION. ARCTIC LANDSCAPES. A literature review of revegetation and biological aspects of restoration research was completed for arctic and subarctic North America. Although there is a great deal of climatic variation in this region it is generally characterized by extreme conditions such as a short growing assess and permaferet. variation in this region it is generally characterized by extreme conditions, such as a short growing season and permafrost. Most of the revegetation research has been undertaken in the last six years as a result of increased natural resource development. The primary goal has been erosion control, with aesthetics, minimization of thermokarst, and production of browne as other objectives. Revegetation and long-term restoration methods depend upon such variables as the site conditions unvisent seems (sense-like variables). the site conditions, nutrient regime (especially se this is influenced by the climatic conditions in the Arctic and Subarctic), plant adaptations, and the selection of native or introduced species. Technologies which have been developed to meet these conditions primarily include seedbed preparation, use of seed mixes, and fertilization and seeding methods. Most of the research has focused on the use of agronomic grasses and legumes. These are selected on the basis of a number of factors, such as cold hardiness and growth form prior or evaluation in the laboratory and the field. The most successful species to date have been Arctared fescue and Nugget bluegrass in the Arctic, while these two as well as creeping red fescue, meadow foxtail, Frontier reed canarygrass, Durar hard fescue, slender wheatgrass, and Icelandic pos did well in the Subarctic. Similar methods have been attempted to a more limited extent with evaluation of native herbaceous and woody species which seem promising on the basis of natural succession studies. There are a number of continuing research needs for arctic and subarctic revegetation. These include fertilization strategies, development of specialized techniques (such as springing) for native species, and longer term studies. It is particularly important to integrate short-term revegetation methods with long-term restoration goals. the site conditions, nutrient regime (especially as this is influenced by the climatic conditions in the Arctic and Subarc-

MECHANICS OF CUTTING AND BORING. PART II: KINEMATICS OF AXIAL ROTATION MACHINES.

Mellor, M., June 1976, 45p., ADA-027 279, 11 refs. 31-4177

ROCK DRILLING, ROTARY DRILLING, AUGERS, TUNNELING (EXCAVATION), MECHANICAL PROPERTIES, EXCAVATION, CUT-TING TOOLS.

TING TOOLS.
This report, which is one of a series on the mechanics of cutting and boring in rock, deals with the kinematics of machines such as rotary drills, augers, tunnel boring machines, correr, and raise borers, in which the rotary cutting unit revolves about an axis that is parallel to the machine's direction of advance. The discussion and analysis covers the geometry and motion of various components of the cutting system, including such topics as tool trajectories, tool speeds, motions of the more complicated mechanisms, chipping depth, penetration rates, production and clearance of cuttings, tool angles, and spatial distribution of cutters. Worked examples are given to illustrate the application of various equations to practical problems.

CR 76-17
MECHANICS OF CUTTING AND BORING.
PART III: KINEMATICS OF CONTINUOUS BELT MACHINES.

Mellor, M., June 1976, 24p., ADA-027 833, 2 refs. 31-4178

ROCK DRILLING, EXCAVATION, CUITING TOOLS, CONTINUOUS BELT MACHINES.

TOOLS, CONTINUOUS BELT MACHINES. This report, which is one of a series on the mechanics of cutting and boring in rock, deals with the kinematics of machines which utilize a continuous belt as the cutting unit (e.g. coal saws, shale saws, digger-chain treachers). The discussion and analysis covers the geometry and motion of various components of the cutting system, including such topics as chipping depth, production and conveyance of cuttings, tool trajectories, tool speech, tool angles, and arrangement of cutting tools on the belt. Worked examples are included to illustrate the application of various equations to practical problems.

CR 76-18 THICKNESS AND ROUGHNESS VARIATIONS OF ARCTIC MULTIYEAR SEA ICE.

Ackley, S.F., et al, June 1976, 25p., ADA-028 086, 11 Hibler, W.D., III, Kugzruk, F.K., Kovacs, A., Weeks,

31-4179

SEA ICE, ICE COVER THICKNESS, SURFACE ROUGHNESS, MODELS.

Three surface elevation and ice thickness profiles obtained during the 1972 Arctic Ice Dynamics Joint Experiment Pilot Study on a multiyear ice floe were analyzed to obtain relationships between the surface elevation, thickness and physical properties of the ice. It was found that for ice freeboards Study on a multiyear ice floe were analyzed to obtain relationships between the surface elevation, thickness and physical properties of the ice. It was found that for ice freeboards from 0.10 m to 1.05 m shove sea level a linear relationship between the ice density and the freeboard could be postulated in a statistical relationship consistent with the observed physical properties, which indicate that as the ice freeboard increases, the ice salimity decreases and the higher freeboard or thicker ice therefore decreases in density. Using this variable density with freeboard relationship, a model was constructed to predict the ice thickness, given the ice freeboard and snow depth alone. The model was compared with two other models, one assuming constant ice density (independent of freeboard) and the other using smoothing filters for predicting the ice thickness. It was found that the variable density prediction model gave the best approximation to the observed ice thickness, with a standard error between the measured and predicted value of about 0.4 m, compared with errors from 50 to 100% higher for the other two models. The model was also compared with data on multiyear ice from two other investigations in different regions and was found to give error estimates similar to the error of the data set on which the model was based. It is therefore concluded that the model can be useful to estimate multiyear ice thicknesses from surface elevation information obtained either by ground-based techniques or by serial methods such as laser profilometry or stereo serial photogrammetry. The effect of the variable density on estimates of the stresses from sources other than isostatic imbalance loading was examined and the results are presented in an appendix. Consideration of this property led to the conclusion that stresses from sources other than isostatic imbalance must account for 75% or more of the bending stresses necessary to induce cracking in multi-year ice.

CR 76-19 WASTEWATER RENOVATION BY A PROTO-TYPE SLOW INFILTRATION LAND TREAT-MENT SYSTEM.

Iakandar, I.K., et al, June 1976, 44p., ADA-029 744, Bibliography p.33-35. Sletten, R.S., Leggett, D.C., Jenkins, T.F.

32-1066

WASTE TREATMENT, WATER TREATMENT. SOIL CHEMISTRY, SEEPAGE.

SOIL CHEMISTRY, SEEPAGE.

The feasibility of a slow-infiltration land treatment system as an alternative to advanced waste treatment of wastewater was studied using six outdoor test cells. Wastewater was applied to forage grasses by spray irrigation. Parameters studied were wastewater application rate, effect of pretreatment and soil type and seasonal effects on the treatment system. Activated sludge pretreatment of the applied wastewater did not improve the overall quality of the product water from this slow-infiltration system. The uptake of nutrients by forage grasses accounted for significant removal of nitrogen and phosphorus from applied wastewater during the growing season. Other renovative mechanisms, namely nitrification/dentrification of applied nitrogen and phosphorus immobilization and fination by the soils may have accounted for further renovation of the applied effluents. The nitrogen loading rate appeared to be the critical factor in limiting the amount of wastewater that could be successfully applied to this type of land treatment system, at least over the the amount of wastewater that could be successfully applied to this type of land treatment system, at least over the short term. Also the renovative mechanisms for nitrogen were found to be seasonally dependent. Due to decreased nitrification and sorption of ammonium by sold components nitrogen was stored in the winter months. The sorbed ammonium underwent nitrification in the warmer months, giving rise to a high concentration of nitrate. N in spring. The higher nitrate concentrations observed in leachast after the first twent of matternate continuations. the first year of wastewater application were attributed to mineralization of native organic-N. Application of 15 cm/week of secondary effluent containing 27 mg/l total

N to sandy loam soil produced percolate water containing NO3-N concentrations consistently in excess of accepted drinking water standards (10 mg NO3-N/l). Leaching phosphorus was not observed but needs further study to predict long-term effects. Winter-time application was successful in terms of operational parameters, but the renovative capacity for nitrogen was impaired. The effect on the cessum in terms or operational parameters, but the renovative capacity for nitrogen was impaired. The effect on the other water quality parameters such as suspended solids, BOD, fecal coliform and organic-C was essentially complete removal. There was a negative chloride balance which was presumed to be due to plant uptake.

APPARENT ANOMALY IN FREEZING OF OR-DINARY WATER.

Swinzow, G.K., June 1976, 23p., ADA-039 177, 9 refs. 32-1067

ICE FORMATION, ICE CRYSTAL NUCLEI, SUPERCOOLED WATER, IMPURITIES, TEMPER ATURE VARIATIONS, LABORATORY TECHNIQUES.

TECHNIQUES.

Under ordinary conditions the freezing of water begins with supercooling and ice nucleation, and proceeds at 0°C at the ice/water interface until ice formation stops. The presence of solutes, high pressure, or dispersal in fine proce causes the water to freeze at temperatures below 0°C (the so-called freezing point depression). Whenever freezing begins, it proceeds at a constant temperature at a temperature which becomes progressively lower. A temperature rise during ice formation is considered here to be an anomaly. Under all equal circumstances, the conditions under which an anomalous freezing temperature is observable appear to be very special. This report describes two different experiments displaying the anomalous rise of temperature after nucleation and during ice formation. In one case the water was dispersed in the fine pores of fine powders; in the other case pure water was frozen in a transparent insulated cell. Photographic observations were made; relations of ice surface to water volume were measured.

CR 76-21 COMPRESSIBILITY CHARACTERISTICS OF COMPACTED SNOW.

Abele, G., et al, June 1976, 47p., ADA-028 622, 5 refs. Gow. A.J.

32-1068 SNOW TEMPERATURE, SNOW DENSITY SNOW DEFORMATION, STRESSES, PHASE TRANSFORMATIONS, RECRYSTALLIZATION. TRANSFORMATIONS, RECRYSTALLIZATION. The effects of snow temperature and initial density on the stress vs density and stress vs denormation relationships were investigated for shallow compacted snow in the density range of 0.28 to 0.76 g/cu cm, for a stress range of 0.5 to 72 bars and a temperature range of -1 to -34C at a deformation rate of 40 cm/sec. A decrease in temperature increases the resistance to stress, the effect increasing with applied stress. For any stress, an increase in the initial density results in an increase in the resulting density, the effect decreasing with an increase in stress. The approximate yield envelopes, which define the stress required to initiate any deformation of snow of a particular density and temperature, were determined. Rapid compaction of snow results in extensive recrystallization, significantly different from that of naturally compacted snow. At a stress of 72 bars, transformation to ice occurs only at temperatures above -10C. -10C.

EVALUATION OF MESL MEMBRANE—PUNCTURE, STIFFNESS, TEMPERATURE, SOL-

Sayward, J.M., June 1976, 60p., ADA-027 834, 30 refs.

32-1069 SOIL STRUCTURE, SOIL STRENGTH, PROTEC-TIVE COATINGS, FROST PROTECTION, CEL-LULAR PLASTICS.

LULAR PLASTICS.
Several membrane materials used or considered for MESL (membrane-enveloped soil layer) utilization of poor soils in road construction have been tested for cold effect on puncture and stiffness. PE (polyethylene) film was also tested for solvent soak effects. A simple blunt needle apparatus was devised for puncture testing. For plastic films (mainly PE), both puncture resistance and stiffness increases at low temperature. For non-woven, spunbonded fabrica these properties are little affected by cold. For both non-wovens and PE film, puncture and bending strengths increase linearly with weight or thickness. The slope is steeper for the non-wovens, which generally are stronger on a per unit weight basis. PE film soaked in a hydrocarbon solvent swelled approximately 17% and lost about 30-40% of its puncture strength. These effects are apparently reversible upon drying. sweised approximately 17% and tost about 30-40% of puncture strength. These effects are apparently reversil upon drying. Consideration has been given to seals and patching requirements and to the drying of seals liquids when adhering film to film. Also considered has been possible slippage related to the reported low any of friction of plastic films in soil and the possibility lamination for improved membrane properties.

CR 76-23 STUDY OF PILES INSTALLED IN POLAR SNOW.

Kovaca, A., July 1976, 132p., ADA-029 191, 18 refs. 32-1070 PILE DRIVING, SNOW BEARING STRENGTH, SNOW MECHANICS, GREENLAND. VANADIUM AND OTHER ELEMENTS IN GREENLAND ICE CORES.

Herron, M.M., et al, July 1976, 4p., ADA-029 356, 16

Langway, C.C., Jr., Weiss, H.V., Hurley, J.P., Kerr, R.,

SNOW COMPOSITION, CHEMICAL ANALYSIS, ICE CORES, ICE COMPOSITION, IMPURITIES, GREENLAND.

GREENLAND.

Chemical analysis of surface snows and deeper ice core samples from Milcent, Greenland, indicates a marine origin for Na and Cl and a terrestrial origin for Al, Mn and V. Pre-1900 enrichment factors, based on average crustal v. Pre-1901 enrichment factors, based on average crustal v. V. Pre-1900 enrichment factors, based on average crustal composition, are high for Zn and Hg and appear to be related to their volatility. A comparison of pre-1900 and 1971-1973 concentrations of V and Hg shows no decided increase from industrial production; however, the abundance of Zn (relative to Al) increased three-fold during this time period. The chemical composition of ancient ice is extremely useful in interpreting modern aerosols.

CR 76-25 BASELINE DATA ON THE OCEANOGRAPHY OF COOK INLET, ALASKA.

Gatto, L.W., July 1976, 84p., ADA-029 358, Bibliography p.78-81. 32-1072

OCEAN CURRENTS, TIDAL CURRENTS, WATER CHEMISTRY, SEDIMENT TRANS-PORT, TURBULENT FLOW.

WATER CHEMISTRY, SEDIMENT TRANS-PORT, TURBULENT FLOW.
The primary objective of this investigation was to compile baseline information pertaining to the ocean circulation, especially the extent and patterns of tidal currents and tidal funking, in Cook Inlet, Alaska, utilizing aircraft and satellite imagery with corroborative ground truth data. LANDSAT-1 and NOA-2 and -3 imagery provided repetitive, synoptic views of surface currents, water mass migration and sediment distribution during different seasons and tides. Color, color infarred and thermal infrared imagery acquired on 22 July 1972 with the NASA NP-3A aircraft were used to analyze currents, mixing patterns and sediment dispersion in selected areas. Temperature, salinity and suspended sediment concentration data and hand-held photography were utilized as ground truth information in the interpretation of the aircraft and satellite imagery. Coriolis effect, semidiumal tides and the Alaska current govern the estuary circulation. Clear, oceanic water enters the inlet on the southeast during flood tide, progresses northward along the east shore with minor lateral mixing, and remains a distinct water mass to the latitude of Kasliof-Niniichik. South of the forelands, mixing with turbid inlet water becomes extensive. Turbid water moves outh primarily along the north shore during ebb tide and a shear zone between the two water masses forms in mid-inlet south of Kalgin Island. Currents adjacent to and north of the forelands are complicated by tidal action, coastal configuration and bottom effects. Turbulence is greatest throughout the water column along the south shore and stratification is more pronounced in Kamishak and Kachemak Baya, especially when fresh water runoff is high. Most of the sediment discharged into the inlet is deposited on the extensive tidal flats or removed by tidal currents along the west side during ebb flow. Bottom scouring is evident along the east shore south of Pt. Possession. CR 76-26

DEBRIS OF THE CHENA RIVER.

McFadden, T., et al, July 1976, 14p., ADA-029 357,

Stallion, M. 32-1073

RIVERS, LOGIAMS, UNITED STATES—ALAS-KA—CHENA RIVER.

Debris over a 44-mile stretch of the Chena River was studied. The study area extended from the first bridge on the Chena Hot Springs Road to the Chena River Flood Control damsite. The purpose of the study was to assess the potential danger to the Chena River Flood Control Dam outlet structure. Debris was catalogued, log jams were measured, and sources of debris were studied. The average size of logs was determined, as well as the number of logs present on the river. The authors concluded that a serious debris problem existed and would remain serious for the foreseeable future. Recommendations for debris handling were made. Debris over a 44-mile stretch of the Chena River was studied.

CR 76-27
ENERGY BALANCE AND RUNOFF FROM A SU-BARCTIC SNOWPACK.

Price, A.G., et al. August 1976, 29p., ADA-030 096, Bibliography p.28-29. Dunne, T., Coibeck, S.C.

32-1074

SNOW HYDROLOGY, SNOWMELT, RUNOFF, MOISTURE TRANSPER, TUNDRA VEGETA-TION, FOREST LAND.

MOISTURE TRANSPER, TUNDRA VEGETATION, FOREST LAND.

In Part I a physically based model was used to predict
daily snowmelt on 2,000 ag m piots in the Suberretic. The
plots had a range of sepects and inclinations in boreal forest
and on the tundra. The energy balance, computed for
each of the plots, was compensated for differences in radiative
and turbulent energy fluxes caused by varied slope geometry
and vegetative cover. The turbulent energy fluxes were
also corrected for the effects of the stable stratification of
the air over the snow surface. The predictions of the
model were compared with daily melts derived from runoff
measured on the snowmelt plots. The results show that
the method is a good predictor of daily amounts of snowmelt,
although some uncertainties are introduced by changes in
the snow surface during the melt period. In Part II,
a physically based model of the movement of water through
snowpacks was used to calculate hydrographs generated by
diurnal waves of snowmelt on the tundra and in the boreal
forest of subarctic Labrador. The model was tested against
measured hydrographs from hillside plots that sampled a
range of aspect, gradient, length, vegetative cover, and snow
depth and density. The model yielded good results, particularly in the prediction of peak runoff rates, though there
was a slight overestimate of the lag time. A comparison
of predictions against field measurements indicated that, given
the ranges over which each of the controls is likely to
arry, the two most critical factors controlling the production for the controls is they to of predictions against field measurements indicated that, given the ranges over which each of the controls is likely to vary, the two most critical factors controlling the hydrograph are the snow depth and the melt rate, which must be predicted precisely for short intervals of time. Permeability of the snowpack is another important control, but it can be estimated closely from published values.

ANALYSIS OF EXPLOSIVELY GENERATED GROUND MOTIONS USING POURIER TECH-

Blouin, S.E., et al, August 1976, 86p., ADA-030 060, 18 refs.

Wolfe, S.H. 32-1075

SEISMIC SURVEYS, WAVE PROPAGATION, VI-BRATION, EXPLOSION EFFECTS, NUCLEAR EXPLOSIONS, EARTH MOVEMENT, FOURIER TRANSFORMS OF SELECTED GROUND-MO-TION TIME HISTORIES FROM FIVE UNDER-GROUND HIGH-EXPLOSIVE AND NUCLEAR DETONATIONS ARE USED TO DEFINE THE TRANSMISSION PROPERTIES (TRANSFER FUNCTIONS) OF THREE ROCK TYPES.

FUNCTIONS) OF THREE ROCK TYPES.

Absorption, a measure of a rock's energy dissipating characteristics, is expressed for each of the tests as a function of the frequency of transmission. Dispersion results from a variation in transmission velocity with frequency and is described for each test by a phase velocity spectrum. The ransmission properties from one of the sites are used to predict a ground-motion time history at that site from another nuclear event. The potential use of Fourier techniques to make ground-motion predictions and to measure in-situ material properties is discussed.

CR 76-29
FAILURE OF AN ICE BRIDGE. DenHartog, S.L., et al, August 1976, 13p., ADA-030

413. 2 reft. McFadden, T., Crook, L. 32-1077

BRIDGES, ICE COVER STRENGTH, ICE BEAR-ING CAPACITY.

In order to verify current theoretical equations on ice bearing capacity, a heavily loaded truck was used to make successive passes over two ice bridges. Breakthrough occurred on one bridge with a vehicle weight of 53,630 lb (24,327 kg). The ice thickness was 17.5 in. (44.5 cm). This one test was in good agreement with the theoretical equations.

CR 76-30
REMOTE SENSING OF LAND USE AND WATER QUALITY RELATIONSHIPS—WIS-CONSIN SHORE, LAKE MICHIGAN.
Haugen, R.K., et al, Aug. 1976, 47p., ADA-030 746, Bibliography p.42-43.
McKim, H.L., Marlar, T.L.

32-1078

REMOTE SENSING, AERIAL SURVEYS, SPACE-BORNE PHOTOGRAPHY, INFRARED PHO-TOGRAPHY, LAND DEVELOPMENT, UNITED STATES—WISCONSIN.

The fe of this investigation was to assess the utility of rem sensing techniques in the study of lend users area. It following types of serial imagery were evaluated for this purpose: high altitude (60,000 ft) color, color infrared, multispectral black and white, and thermal; low altitude (less than 5,000 ft) color infrared, multispectral black and white, thermal, and passive microwave. A non-imaging hand-held four-band radiometer was evaluated for utility in providing data on suspended sediment concentrations. Land use analysis includes the development of manning and orasnité. of this investigation was to assess the The fe providing data on suspended sediment concentrations. Land use analysis includes the development of mapping and quantification methods to obtain baseline data for comparison to water quality variables. Suspended sediment loads in streams, determined from water samples, were related to land use differences and soil types in three major watersheds. A multiple correlation coefficient R of 0.85 was obtained for the relationship between the 0.6-0.7 micron incident and reflected radiation data from the hand-hald radiometer and concurrent ground measurements of suspended solids in streams. Applications of the methods and baseline data developed in this investigation include mapping and quantification of land use, input to watershed ranoff models. data developed in this investigation include mapping as quantification of land use, input to watershed runoff mode estimation of effects of land use changes on stream sediment tion, and remote sensing of suspended sediment conte of streams. High altitude color infrared imagery was four to be the most acceptable remote sensing technique if the mapping and measurement of land use types.

ANALYSIS OF POTENTIAL ICE JAM SITES ON THE CONNECTICUT RIVER AT WINDSOR,

VERMONT. Calkina, D.J., et al, Sep. 1976, 31p., ADA-031 572. 11

Hutton, M.S., Mariar, T.L.

32-1079 RIVER ICE, ICE JAMS, ICE MECHANICS, WATER FLOW.

WATER FLOW.

Sections in the Connecticut River where ice jam potential is high were identified through the use of low-altitude black and white photographs taken during low-flow, ice-free conditions. The hydraulics and mechanics of ice jam initiation were investigated in the river reach where these sections were identified. Cartain areas were found in the river that had a high susceptibility to ice clogging, but this high potential decreased with increasing discharge because of the improved surface conveyance of the ice through the reach. The stability of ice floss was established along the channel, but the flow generally became unstable as the flow increasion. This was calculated by using a Proude number criterion. Grounding locations for ice became evident when the critical Proude number was zero for a given thickness and water Grounding locations for ice became evident when the critical Froude number was zero for a given thickness and water depth. No single factor was determined to be responsible for initiating the ice jams in the Connecticut River at Windsor. Apparently there existed a multitude of interacting conditions: surface constrictions, possible high backwater conditions from the Brattleboro Dam, a solid ice cover in the backwater of the Brattleboro Dam that prevented ice transport from the Windsor area, deep pools followed by shallow depth sections upstream of bridge piers, a greater ice thickness accumulation of fragmented floes than would result if a uniform cover could be established in the same reach, and the diurnal fluctuation of river stage caused by the release of water at Wilder Dam.

CR 76-32 GROUNDED ICE IN THE PAST ICE ZONE ALONG THE BEAUPORT SEA COAST OF ALAS-

Kovacs, A., Sep. 1976, 21p., ADA-031 352, 13 refs. SEA ICE, FAST ICE, ICE PHYSICS, PRESSURE

RIDGES.

Four large grounded multi-year shear ridge formations were found in the grounded ice subzone of the fast ice zone near the Harrison Bay/Prudhoe Bay area of Alaska. A 166m-long cross section of one of these formations was obtained by leveling and sonar measurements. These measurements revealed that the maximum ridge height was 12.6 m and that the formation was grounded in 17-18 m of water. The salinity temperature, brine volume and density m and that the formation was grounded in 17-18 m of water. The salinity, temperature, brine volume and density of the ice were determined on aemples obtained by coring. The physical characteristics of the formations as observed in satellite, SLAR and aerial imagery indicate that these formations have not moved between the time of their formation in the fall of 1974 and August of 1976. Evidence of significant aeolian debris discoloring the ice is discussed. CR 76-33
DETECTING STRUCTURAL HEAT LOSSES
WITH MOBILE INFRARED THERMOGRAPHY. PART 4: ESTIMATING QUANTITATIVE
HEAT LOSS AT DARTMOUTH COLLEGE, HANOVER, NEW HAMPSHIRE.
Munis, R.H., et al, Sep. 1976, 9p., ADA-031 803, 3
refs. For Parts I, II, and III of this study see 29-2349,
30-895, and 30-1807 respectively.
Marshall, S.J., Bush, M.A.
32-1081

32-1081

BUILDINGS, HEAT LOSS, INFRARED EQUIP-MENT.

MENT.
During the winter of 1973-74 a mobile infrared thermography system was used to survey campus buildings at Dartmouth College, Hanover, New Hampshire. This report provides both qualitative and quantitative data regarding heat flow through a small area of a wall of one brick dormitory building before and after installation of aluminum reflectors between radiators and the wall. These data were used to estimate annual cost savings for 22 buildings of similar construction having aluminum reflectors installed behind 1,100 radiators. The data were then compared with the actual savings which were calculated from condensate meter data. The discrepancy between estimated and actual annual cost savings is explained in detail along with all assumptions required for these calculations.

CR 76-34 SOME CHARACTERISTICS OF GROUNDED PLOEBERGS NEAR PRUDHOE BAY, ALASKA. Kovacs, A., et al, Sep. 1976, 10p., ADA-031 844, 11 refs. For another version of this report see 32-1082. Gow, AJ. 32-1083

SEA ICE, ICE BOTTOM SURFACE, SOUNDING. ICE STRUCTURE, ACOUSTIC MEASURING IN-STRUMENTS, PRESSURE RIDGES.

STRUMENTS, PRESSURE RIDGES.

Some physical characteristics of two grounded floebergs near
Prudhoe Bay, Alaska, are described. Cross-sectional profiles
of the sails and keels of both floebergs were obtained. Additional studies included investigations of the internal structure
of the floebergs, surveys of the sea floor for evidence of
scoring induced during grounding of the floebergs, and a
brief examination of the organic and sedimentary debris
found entrained within the floebergs.

CR 76-35

CR 19-33
RHEOLOGICAL IMPLICATIONS OF THE INTERNAL STRUCTURE AND CRYSTAL FABRICS OF THE WEST ANTARCTIC ICE SHEET AS REVEALED BY DEEP CORE DRILLING AT BYRD STATION.

Gow, A.J., et al, Sep. 1976, 25p., ADA-031 745, Bibliography p.22-25. Williamson. T.

mson, T. 32-1097

ICE SHEETS, DRILL CORE ANALYSIS, ICE ME-CHANICS, ICE STRUCTURE, ANISOTROPY, ANTARCTICA—BYRD STATION.

Crystalline textures and fabrics of ice cores from the 2,164-m-thick ice sheet at Byrd Station, Antarctica, reveal the existence of an anisotropic ice sheet. A gradual but persistent increase in the c-axis preferred orientation of the ice methick ice sheet at Byrd Station, Antarctica, reveal the existence of an anisotropic ice sheet.

A gradual but persistent increase in the c-axis preferred orientation of the ice crystals was observed between the surface and 1,200 m. This progressive growth of an oriented crystal fabric is accompanied by a 20-fold increase in crystal size between 50 and 600 m, followed by virtually no change in crystal size between 600 and 1,200 m. A broad vertical clustering of c-axes develops by 1,200 m. Between 1,200 and 1,300 m the structure transforms into a fine-grained mossic of crystals with their basal glide planes now oriented substantially within the horizontal. This highly oriented fine-grained structure, which persists to 1,800 m, is compatible only with a strong horizontal shear deformation in this part of the ice sheet. Rapid transformation from single- to multiple-maximum fabrics occurs below 1,800 m. This transformation, accompanied by the growth of very large crystals, is attributed to the overriding effect of relatively high temperatures in the bottom layers of old ice at Byrd Station rather than to a significant decrease in stress. The zone of single-maximum fabrics between 1,200 and 1,800 m also contains numerous layers of volcanic dust. Fabrics of the very fine-grained ice associated with these dust bands indicate the bands are actively associated with these dust bands indicate the bands are actively associated with these dust bands indicate that plastic deformation (intracrystalline glide) in the zone of strong single-maximum fabrics, and movement of ice along discrete shear planes situated well above bedrock, are sho major contributors to the flow of the ice sheet. Any extensive shearing at depth could seriously distort stratigraphic records contained in the ice cores, such as climatic history inferred from stable isotope analysis. Also, the common practice of using simplified flow models to approximate the depth-age relationships of deep ice sheet coves may meed to be revised in light of the deformation

CR 76-36

ROCK, FROZEN SOIL AND ICE BREAKAGE BY HIGH-FREQUENCY ELECTROMAGNETIC RADIATION. A REVIEW.

Hoekstra, P., Oct. 1976, 17p., ADA-039 178, 17 refs. 32-1098

ROCK EXCAVATION, FROZEN GROUND STRENGTH, EXCAVATION, DIELECTRIC PROPERTIES, ELECTROMAGNETIC PROPER-TIES, MATHEMATICAL MODELS.

TIES, MATHEMATICAL MODELS.

In the past decade, various workers have investigated the use of high-frequency electromagnetic radiation for breaking and excavating rock and frozen ground.

This report reviews the high-frequency dielectric properties of these materials, the physics of heating, and the existing literature on these subjects. The high-frequency dielectric properties of rocks and soils, and the absorption of energy by these materials, are mainly determined by their liquid water contents. Computer modeling was used to calculate absorption energy as a function of distance behind irradiated faces of earth materials. The resulting computations showed that most enery is absorbed in the first few continueters of frozen ground and weak soils. However, in hard rocks of low water content, electromagnetic waves penetrate more deeply, and significant amounts sous. However, in hard rocks of low water content, electromagnetic waves penetrate more deeply, and significant amounts of energy are also absorbed tens of centimeters behind the irradiated floes.

Test results showed that electromagnetic rock breakage is fessible only for excavations in hard rock; test results from the use of electromagnetic radiation for excavating tunnels in weak rocks and frozen ground are not pro

AIRBORNE RESISTIVITY AND MAGNETOME-TER SURVEY IN NORTHERN MAINE FOR OB-TAINING INFORMATION ON BEDROCK GEOLOGY.

lellmann, P.V., et al, Oct. 1976, 19p., ADA-032 733,

Arcone, S.A., Delaney, A.J. 32-1099

MAGNETIC MEASUREMENT, BLECTRICAL RESISTIVITY, GEOPHYSICAL SURVEYS, GEOLOGY, UNITED STATES—MAINE.

GEOLOGY, UNITED STATES—MAINE.

Geophysical studies were conducted during September and October of 1975 in northern Maine to locate rock types suitable for construction purposes for the proposed Dickey-Lincolo School Dam Project. Simultaneous airborne magnetic meter and VLF electrical resistivity and of total magnetic intensity above the earth's background magnetic field. During the same time period, ground and multi-elevation surveys were performed over a special test sector of known geology. The ground and airborne study in the test sector aided in interpretation of the data by revealing a strong correlation between igneous geology, resistivity, and magnetic intensity. Lack of a similar correlation between resistivity and magnetic data in the remainder of the survey area suggested an absence of additional areas of igneous rocks. The multi-elevation survey of the test area indicated that changes in flight altitude, necessitated by the topographic relief encountered, would survey of the test area indicated that changes in might attitude, mocessitated by the topographic relief encountered, would not seriously affect the regional resistivity patterns. Although there was no strong evidence of igneous rocks outside the test sector, suitable rock types may exist within the Des geologic unit (cyclically bedded gray slate and sandstone) in the central part of the main survey area, where most of the high resistivity contours occur.

CR 76-38

WATER ABSORPTION OF INSULATION IN PROTECTED MEMBRANE ROOFING SYS-

Schaefer, D., Oct. 1976, 15p., ADA-032 089, 12 refs. 32-1100

INSULATION. **PROTECTIVE** WATERPROOFING, ABSORPTION, ROOPS.

Current methods for evaluation of the moisture absorption of plastic insulations (ASTM-C-272-53 and ASTM-C-355of plastic insulations (ASTM-C-272-53 and ASTM-C-355-64) due to vapor pressure gradients or immersion rely on abort time periods to predict long term performance. This procedure may not provide accurate information on performance since in practice insulations may absorb more moisture than these tests indicate. A series of tests was conducted on extruded polystyrene roof insulation that had been in place, exposed to environmental moisture and pressure gradients, for a maximum of 36 months. Results indicate that moisture absorption of 1.5% by volume can be expected in the field.

CR 76-39 EFFECTS OF WASTEWATER APPLICATION ON THE GROWTH AND CHEMICAL COMPOSITION OF FORAGES.

Palazzo, A.J., Oct. 1976, 8p., ADA-032 774, 9 refs.

32-1101
WASTES, WATER, SOIL CHEMISTRY, WATER
CHEMISTRY, PLANTS (BOTANY), GRASSES.
The contribution of a forage mixture in the renovation of
wastewater by a prototype slow infiltration land treatment
system was studied from June 1974 to June 1975. The
forage was grown in six outdoor cells, three containing a
Windsor sandy loam soil and three a Cariton silt loam.
Three cells received primary and three received secondary
wastewater at various application rates. Crop yields, soils
and tissue analyses, plant removal efficiency and total uptake
of applied. Dry matter production, plant heavy metal concen-

trations, and plant removal of nitrogen and phosphorus all increased as the rate of applied wastewater increased from 5 to 15 cm/week. Total dry matter production ranged from 9.63 to 12.99 metric total/ha, and total uptake of nitrogen and phosphorus ranged from 309 to 453 kg/ha and from 32 to 42 kg/ha, respectively. An increase in wastewater application rates suppressed nitrogen and phosphorus removal efficiency by plants. Forages receiving 5 cm/wk of wastewater removed 474% and 83% of the N applied during the growing season, in contrast to the 44% removed by those treated with 15 cm/wk of wastewater. Forages grown on the Chariton soils produced a greater amount of dry matter and removed more N and less heavy metals than those grown on the Windsor soils. Soil analyses in spring 1975 showed reductions in soil pH and in the total amounts of exchangeable cations, as compared to analyses performed in spring 1974. Soils receiving the greatest application rate of wastewater showed the greatest reduction. total amounts of exchangeable cations, as compared to analyses performed in spring 1974. Solls receiving the greatest application rate of wastewater showed the greatest reduction. Wastewater application during 1974 increased the amount of soluble soil P. Higher amounts of soil-extractable P were also noted at the highest wastewater application rate.

PHOTOMACROGRAPHY OF ARTIFACTS IN TRANSPARENT MATERIALS. Marshall, S.J., Nov. 1976, 31p., ADA-033 670, 31 refa.

32-1102

ICE, IMPURITIES, PHOTOMACROGRAPHS.

Several original methods were developed to photograph artifacts in transparent materials such as ice. The artifacts, occurring in the surface, bulk, and interface, were generally, 0.01 mm to 70 mm in size. Sample preparation, illumination, focusing and other technical problems are discussed in detail. Several sample photographs are included.

CR 76-41 GEODETIC POSITIONS OF BOREHOLE SITES OF THE GREENLAND ICE SHEET PROGRAM. , S.J., Nov. 1976, 7p., ADA-033 840, 9 refs. 32-1103

GEODETIC SURVEYS. BORBHOLES, ICE SHEETS, ICE CREEP, GREENLAND.

SHEETS, ICE CREEP, GREENLAND.

Eight Geoceiver stations were established and suitably marked along or near the crestiline of the Greenland ice sheet during GISP field operations from 1971 to 1975. At one of these stations, DYE-3, repeated Geoceiver positions indicate an ice velocity of 12.7 m/yr on an azimuth of approximately 60 deg. Data from the International Greenland Glaciological Expedition (EGIG) surveys show that ice flow in the vicinity of Crete is redisting outward from a dome to the south. Two independent calculations of the state of equilibrium at Crete indicate ice sheet thinning rates of 0.25 to 0.37 m/yr, while direct measurement of elevation change by EGIG indicates nice sheet thickening rate of of approx 0.06 m/yr. Resolution of these differences must await turther geophysical work and deep drilling in the ice sheet.

CR 76-42 ARCHING OF MODEL ICE FLORS: EFFECT OF MIXTURE VARIATION ON TWO BLOCK SIZES.

Calkins, D.J., et al, Nov. 1976, 11p., ADA-033 841, 5

Ashton, G.D. 32-1104

EXPERIMENTAL DATA, FLOATING ICE, ICE

A study of arching of mixed, square fragmented ice floes at an opening in an ice boom is documented, using results from a model study in which two sizes of plastic blocks represented real ice. A power function, relating the upstream ice concentration to the ratio of a characteristic block dimenrepresented real ice. A power function, relating the upstream ice concentration to the ratio of a characteristic block dimension to the gap opening, is found adequate to distinguish between arching and nonarching events for block mixtures of two component sizes. It is demonstrated that when the respective total areas of the two block components are nearly equal, a minimum ice concentration initiates an arch across the opening. As the mixture of two sizes of blocks approaches a uniform (non-sized) mixture in higher concentration. across the opening. As the mixture of two sizes of blocks approaches a uniform (one-sized) mixture, a higher concentration of ice is needed to initiate the arch. When the ratio of the block dimension to the gap opening is equal to or less than 0.10, arching of the fragmented ice is not possible, even when the upstream ice discharge exceeds the maximum discharge of ice through a gap opening. The distribution of fragmented ice areas is an important parameter in establishing the minimum size of opening at which an ice boom will retain its arching capability.

SUPPRESSION OF ICE FOG FROM COOLING

McFadden, T., Nov. 1976, 78p., ADA-035 322, Bibliography p.71-75. 32-1105

ICE FOG, FOG FORMATION, FOG DISPERSAL, PONDS, ICE COVER EFFECT, PROTECTIVE COATINGS.

Ice fog generated at the Eielson AFB power plant cooling pond contributes heavily to the total ice fog problem on the base. Several methods for ice fog suppression were studied and two techniques were tested experimentally. periments were also conducted to determine the may of the various modes of heat transfer within the microchimate. Values of evaporative and radiative loss during ice fog are presented. Ice cover is Ice cover is sh

to be an effective ice fog suppression technique. Idonomolecular films are also shown to be effective and offer some unique advantages, such as ease of application and low overall cost. The hest normally lost to evaporation must be dissipated by other means during suppression. With the ice cover. During suppression with monomolecular films, the hest must be dissipated by increasing radiative and convective fores. The simplicity of application of monomolecular films, along with their lower cost, combine to make this technique attractive; however, the lower pond temperatures and increased suppression effectiveness weigh heavily in flavor of the ice cover technique.

CR 76-44 THERMODYNAMIC DEFORMATION OF WET SNOW.

Colbeck, S.C., Nov. 1976, 9p., ADA-033 830, 10 refs. 32-1106 WET SNOW, SNOW DEFORMATION, THER-

MODYNAMIC PROPERTIES. MODYNAMIC PROPERTIES.

The deformation of wet snow is explained in terms of the thermodynamics of the three phases of water. When deformation by particle rearrangement is fully developed, deformation can occur most rapidly by melting at the particle content. The rate of deformation is highly sensitive to the liquid water content, ionic impurity content, particle content area, and stress level. A model of the hydrostatic deformation of wet snow is constructed, and examples of the deformation of wet snow is constructed, and examples of the deformation.

of wet show is constructed, and examples of the deformation of wet snow are given for a variety of conditions. These results are in agreement with existing experimental evidence. The model socurately simulates the transient nature of the deformation and the effect of water content on the quasi-stable density of wet snow subjected to a constant stress.

AIR CUSHION VEHICLE GROUND CONTACT DIRECTIONAL CONTROL DEVICES. Abele, G., et al, Dec. 1976, 15p., ADA-034 825, 3 reft. Liston, R.A.

32-1107

AIR CUSHION VEHICLES, YAW.

AIR CUSHION VEHICLES, YAW.

The maneuverability of air cushion vehicles can become a serious operational problem when the vehicle's travel route is restricted by obtacles, alopes or cross-wind conditions, or when close-quarter turns are required. While improvement and perfection of serodynamic methods may be a more destrable approach, there is a practical limit to these methods, and the use of ground contact devices requires considerations for providing more positive directional control. Wheels deserve special attention, and therefore are analyzed in more detail because of their obvious application on a variety of land terrains. Brake rods and harrows are more suitable on water, ice and snow. The saucer-shaped ground contact device would cause the least ecological impact on fragile organic terrains such as tundra. Relative directional stability is evaluated in terms of the total yawing momentary produced by wheel arrangements (single, dual, tandem), location on the vehicle, and operational modes (free-rolling, braked, or a combination of the two). The available moments are plotted against the yaw angle of the vehicle to determine the most effective operational mode with a particular wheel arrangement for any yaw condition. The analysis is limited to retractable devices which act as moment producing brakes or rollers and do not serve as either propulsion or load support sids. Controlled ground contact with akirt sections to retractable devices which act as moment producing brakes or rollers and do not serve as either propulsion or load support sids. Controlled ground contact with skirt sections having special wearing surfaces may provide a suitable control method and would require the least significant change to the basic design of the vehicle or its components. The concept involves the use of an air flow control mechanism for defining specific skirt sections, thus causing skirt-ground contact at selected areas of the peripheral skirt.

TOPOLOGICAL PROPERTIES OF SOME TREL-LIS PATTERN CHANNEL NETWORKS.
Mock, S.J., Dec. 1976, 54p., ADA-034 824, 27 refs.

CHANNELS (WATERWAYS), TOPOGRAPHIC FEATURES, DRAINAGE, CLASSIFICATIONS. FEATURES, DRAINAGE, CLASSIFICATIONS.

The topological properties of 10 stream networks having moderate to well developed trellis drainage patterns have been compared with those expected in a topologically random population. Magnitude 4 subnetworks above a systematic departure from expectation which can be related to geological controls. A link type classification system was developed controls. A link type classification system was developed and a series of equations describing the probability of occurrence of link types in topologically random populations derived. Analysis of the link structure in the channel networks showed small but persistent deviations from expectation in the well developed trellis pattern streams. In general conclusion is that the topologically random model is a very useful standard with which to compare real channel networks.

CR 76-47 DEVELOPMENT OF LARGE ICE SAWS. Garfield, D.E., et al, Dec. 1976, 14p., ADA-034 899, 6 refs.

Hanamoto, B., Mellor, M. 32-1109

ICE CUTTING, SAWS.

This report describes two mechanical ice-cutting systems for the removal of ice collars at the high pool level on the Foe Lock of the St. Mary's Falls Canal at Sault Ste. Marie, Michigan. One system was a narrow-kerf (3 1/4 iz. wide) coel-cutting chain saw mounted on a bar, driven by a 65-hp wheeled soil trencher which cut a 0.56-in.

wide kerf. The lumber-curting saw's bar was too flexible and the desired cutting traverse speed was not met. The coal-cutting saw cut 6-ft-deep ice collars at traverse speeds of up to 10 ft/min and is acceptable. With a few modifications, the coal-cutting saw would be operational.

RAPID INFILTRATION OF PRIMARY SEW-AGE EFFLUENT AT FORT DEVENS, MASSA-CHUSETTS.

Satterwhite, M.B., et al, Dec. 1976, 34p., ADA-035 730, 26 refi

Stewart, G.L., Condike, B.J., Vlach, E.

GROUND GROUND WATER, WATER TREATMENT, WATER CHEMISTRY, SEWAGE TREATMENT. WATER CHEMISTRY, SEWAGE TREATMENT. Rapid inflitration has provided final treatment to unchlorinated minoff tank effluent at Fort Devens, Massachusetts, since 1942. Wastewater flow has varied seasonally; however, most flows to the 22 treatment beds at the installation in 1973 were 2,676 to 9,541 cu m/day (1.3 million gallons per day). In an operation cycle of simultaneous inundation of three 0,31-hecture treatment beds for 2 days, followed by a 14-day recovery period, affluent application has been about 27.1 m/yr. Chemical analyses of soil samples obtained from the upper 3.05 m of the treatment beds showed that levels of organic matter ranged from substantially to only alightly higher than those of background samples. The quality of the primary effluent applied to the treatment beds and the groundwater in 14 observation wells was determined by comprehensive analysis of the amplies at biweekly intervals. Oroundwater quality in wells located 60 to 100 m from the application area showed that the primary effluent after flowing through the send and gravel formation, had been substantially renovated.

CR 76-49 TREATMENT OF PRIMARY SEWAGE EFFLU-ENT BY RAPID INFILTRATION.

Satterwhite, M.B., et al, Dec. 1976, 15p., ADA-035 390, 22 refs. dike, B.J., Stewart, G.L.

32-1111 AGE TREATMENT, WATER TREATMENT. CHEMICAL ANALYSIS, SEEPAGE.

CHEMICAL ANALYSIS, SEEPAGE.

Treatment of unchlorinated primary sewage effluent by using rapid infiltration basins resulted in a high degree of wastewater renovation in a humid, cool northern climate. Inundating 9 treatment basins for 7 days followed by 14 days of rest, from 4 January to 21 June 1974, resulted in effluent additions totaling about 27 m. Analysis of the groundwater from the treatment site and from the peripheral sres showed that total colifform bacteria, 3-day biochemical crygen demand, and chemical caygen demand were essentially removed, while effluent concentrations. Total nitrogen additions to the treatment basins during the 7-day inundations period were shout 54% greater than the nitrogen additions in the 1973 investigations.

Even so, groundwater nitrogen concentrations were closely comparable to those observed in the 1973 study. Efforts to increase nitrogen removal through longer inundation periods resulted in a gradual decrease in the rightness of the basins. Calculation of the organic matter additions strongly suggested that the reduced infiltration capacities of the basins. Calculation of the organic matter additions strongly suggested that the reduced infiltration rates resulted from surface clogging. This study showed that proper management is needed if rapid infiltration basins are used for nitrogen removal by maintaining effluent infiltration in northern climates.

CR 77-01

CR 77-01 GROWTH HISTORY OF LAKE ICE IN RELA TION TO ITS STRATIGRAPHIC, CRYSTAL-LINE AND MECHANICAL STRUCTURE.

Gow, A.J., et al, Jan. 1977, 24p., ADA-036 228, 9 refs Langston, D.

LAKE ICE, ICE GROWTH, ICE STRUCTURE, ELECTRICAL RESISTIVITY, CRYSTAL ORIEN-TATION, ICE MECHANICS.

TATION, ICB MBCHANICS.
Studies of the growth history and structural characteristics of winter ice covers on two New Hampshire lakes are described. These investigations included measurements of ice cover thickness, characterization of the strusignable and crystalline structure of the ice, identification and classification of major ice types and measurements of electrolytic conductivity. The formation of cracks and flaws in the ice and thereffects on the mechanical properties of the ice were also investigated. A method of correlating ice growth with surface wind and temperature measurement is described and the interrelationships of the various physical and mechanical properties of temperate lake ice covers are discussed. properties of temperate lake ice covers are discussed.

COMPUTER PROGRAM TO DETERMINE THE RESISTANCE OF LONG WIRES AND RODS TO NONHOMOGENEOUS GROUND

Arcone, S.A., Jan. 1977, 16p., ADA-036 250, 6 refs.

COMPUTER PROGRAMS, ELECTRICAL RESISTIVITY, MODELS, PROZEN GROUND PHY-SICS.

A computer program was developed for finding the resistance to ground of two simple electrodes, a strahorizontal wire and a vertically driven rod. The object of this study was to develop a rapid means of finding

resistance to ground of simple electrode types in arctic environments where a two-layer earth model, frozen and unfrozen ground, is applicable. The program can consider homogeneous as well as two-layer earth, and the length, diameter and position of the electrodes. Some specific computations are presented in comparison with previous theoretical work of other authors. The following conclusions were made:

1) A maximum run time of 165 aeconds is needed for all two-layer arctic models where (a) the depth of the upper layer does not exceed 10 m, (b) the vertical rod length is less than 30 m, or (c) the horizontal wire length is less than 100 m; 2) Best accuracy is obtained when rod and wire radii are less than 0.01 m; and 3) Coincidence of the center of the vertical electrode with the two-layer interface must be avoided.

EFFECT OF TEMPERATURE ON THE STRENGTH OF PROZEN SILT. Haynes, F.D., et al, Feb. 1977, 27p., ADA-037 932, 27

redi.
Karalius, J.A.
32-1139
FROZEN GROUND STRENGTH, COMPRESIVE STRENGTH, SEDIMENTS, TENSILE STRENGTH, STRAINS, TEMPERATURE EPPECTS, PERMAPROST, TESTS.

FECTS, PERMAPROST, TESTS.

Tests were conducted in uniaxial compression and tension to determine the effect of temperature on the strength of frozen Fairbanks silt. Test temperatures ranged from OC to -56.7C. Two machine speeds, 4.23 cm/sec and 0.0423 cm/sec, were used for the constant displacement rate tests. Prom the highest to the lowest temperature, the compressive strength increased up to about one order of magnitude and the tensile strength increased one-half an order of magnitude and the tensile strength increased one-half an order of magnitude. Equations are presented which correlate strength with temperature at the strain rates obtained. The initial tangent and 50% strength moduli and the specific energy are given for each test. The mode of fracture and the effects of unfrozen water content and ice matrix strengthening are discussed, and the test results are compared with the data of other investigations.

CR 77-04 ST. MARYS RIVER ICE BOOMS. DESIGN FORCE ESTIMATE AND FIELD MEASURE-MENTS.

Perham, R.E., Feb. 1977, 26p., ADA-037 902, 13 refs. 32-1140

ICE BOOMS, RIVER ICE, ICE STRENGTH, ICE COVER STRENGTH, ICE LOADS, ICE NAVIGATION, UNITED STATES—ST. MARYS RIVER. TION, UNITED STATES—ST. MARYS RIVER. A set of two ice booms with a 250-ft (76m)-wide navigation opening between them was designed to stabilize the ice cover in the harbor at Sault Ste. Marie, Michigan and Ostario, and to reduce the ice losses associated with winter navigation of ships on the St. Marys River. The forces from natural effects on the ice cover were predicted using existing theory and physical dats for the area. The forces in the boom structure resulting from ice cover and boom interaction were estimated. When the ice booms were installed, force mess-present systems were put into selected anchor cables. These systems were operated all winter in conjunction with a modest program of supplemental data gathering. The force data exhibited periods when the force distribution was in good agreement with predictions and periods when the effect of ice on the booms differed substantially from predictions. Sometimes passing ships had a substantial effect on the ice cover and the boom loads, and at other times, the effect was negligible. The direction of travel made little difference on average peak loads. The maximum loads on the booms resulted from natural occurrences.

NUMERICAL STUDIES TO AID INTERPRETA-TION OF AN AIRBORNE VLP RESISTIVITY

nce on average peak loads. The maxime booms resulted from natural occurrence

Arcone, S.A., Apr. 1977, 10p., ADA-039 904, 17 refs.

PERMAPROST, ELECTRICAL RESISTIVITY, SITE SURVEYS, VERY LOW FREQUENCIES, AIRBORNE RADAR, RADIO WAVES, ANAL-YSIS (MATHEMATICS).

YSIS (MATHEMATICS).

Airborne resistivity surveys, which use the wavetilt phenomena of radiowaves, are used as a preliminary exploration to chanique to find suitable areas for either engineering investigations or geologic reconnaissance explorations. Survey results are usually presented as resistivity flight like profiles or as contour maps from which the interpretation or site selection process must be initiated. To aid in this process and provide additional understanding of the correlation between data obtained from airborne and ground surveys, an analysis was performed to determine a very-low-frequency airborne system's response to toodelled resistivity anomalies assumed to occur at the surface of an idealized flat earth. Some of the assumptions used to simplify the analysis were based on the results of past surveys. The influences of survey altitude, assomaly size, and average ground resistivity upon airborne resistivity patterns were analyzed. The results show that the average resistivity of a region plays an important role in suppressing large resistivity contrasts for anomalies of approximately 1-eq km area. Curves are presented to separate the effects of resistivity contrast and anomaly size, and two examples are given to demonstrate how these curves may be applied to the results of actual surveys.

CB 77-06

DEFENSIVE WORES OF SUBARCTIC SNOW. Johnson, P.R., Apr. 1977, 23p., ADA-051 769, 11 refs. 32-2725

SNOW (CONSTRUCTION MATERIAL), SNOW DENSITY, FORTIFICATIONS, MILITARY OP-**ERATION**

ERATION.
Pield tests at Fort Wainwright, Alaska, carried out in MarchApril 1975 showed that the typical subarctic snow of interior
Alaska can be used effectively to provide protection from
both rifle and mackine gun fire. The undisturbed snow
had an average density of 0.18 g/cu cm, but simple processing,
such as shoveling, increased the density to around 0.34
g/cu cm. Purther processing increased the density to
above 0.40 g/cu cm, but densities much shove that value
were difficult to obtain with simple hand equipment. Tests
of the M16 rifle and M60 and M2HB machine guns showed
that bullet penetration was inversely related to density—
the higher the density the lower the bullet penetration. Design values for the three weapons were determined. A

the higher the density the lower the bullet penetration. Design values for the three weapons were determined. A number of types of snow trenches and structures were designed and tested. They were found to provide good protection, in part since bullets showed a strong tendency to ricochet from the snow surface when striking it at a low angle. Burkep bags filled with snow to revet structures worked very well. Several types of Russian defensive works of snow were tested but proved unsuitable in the light, weak subscretic snow. The times required for troops to build several types of structures using only shovels and scoops were recorded. ral types of structu

MECHANICS OF CUTTING AND BORING. PART 4: DYNAMICS AND ENERGETICS OF PARALLEL MOTION TOOLS.

Mellor, M., Apr. 1977, 85p., ADA-040 760, Bibliogra-phy p.80-82. 32-1142

DRILLING, ROCK EXCAVATION, ICE CUTTING, BOREHOLE INSTRUMENTS, PERMA-FROST, METALS, DESIGN.

PROST, METALS, DESIGN.

The report deals with the cutting of rock and similar materials by parallel motion tools. It examines cutting forces and energy requirements, taking into consideration tool geometry, wear, operating conditions, and material properties. After an introductory discussion of terminology, some general principles are outlined, and relevant theoretical ideas on metal cutting and rock cutting are reviewed. The next section, which is the heart of the report, reviews experimental data on the magnitudes and directions of cutting forces. There is a graphical complication of deta, including some from obscure or unpublished sources. The variables covered include chipping depth, rake angle, relief angle, side rake, base angle, tool width, tool compliance, tool speed, tool wear, tool interactions, and material properties. The second major part of the report treats the energetics of cutting. It begins with a short discussion of relevant principles, and continues with a compilation and review of experimental data, covering the same independent variables as the force section. The report ends with a concise summary of general behavior for parallel motion tools.

CR 77-66 REMOTE SENSING OF ACCUMULATED FRA-ZIL AND BRASH ICE IN THE ST. LAWRENCE

n, A.M., Jr., Apr. 1977, 19p., ADA-039 905, 7 refs.

PRAZIL ICE, ICE CONDITIONS, RIVER ICE, REMOTE SENSING, AIRBORNE RADAR, AERI-AL SURVEYS, CANADA—SAINT LAWRENCE

RIVER.

A broadbanded impulse radar system was used for serial detection of accumulated firail and brash ice in a 9.5-km reach of the St. Lewrence River near Ogden laland. The remote seesing and data reduction system developed for the project provided data sufficient for production of a contour map having 1-ft intervals. With this contour map, the accumulation pattern of frazil and brash ice could be analyzed. Recommendations are given for improving the performance of the serial profiling system.

LABORATORY INVESTIGATION OF THE ME-CHANICS AND HYDRAULICS OF RIVER ICE

Tatinclaux, J.C., et al, Apr. 1977, 45p., ADA-032 471, 7 tefs.

ee, C.L., Wang, T.P., Nakato, T., Kennedy, J.F. 32-1144

ICE JAMS, ICE MECHANICS, ICE COVER STRENGTH, COMPRESSIVE PROPERTIES, ICE FLOES, ICE CONDITIONS, EXPERIMENTAL

This report presents experimental results on the conditions of initiation of an ice jam by a simple surface obstruction, on the equilibrium thickness of an ice jam formed by accumulation and submergence of ice floss, and on the compressive strength of a floating, fragmented ice cover. In the study on los jam initiation, it was found that the minimum concentration of floss in the opening of the obstruction at which a jam occurs is nearly independent of the ratio of width

of constricted passage to channel width and is proportional to a negative power of the ratio of floe length to width of constricted passage. The coefficient of proportionality and the negative exponent of this power function appear to be dependent upon the ratio of floe length to floe thickness and to be strongly affected by the properties of the material of the laboratory floes, in particular by the interparticle riction or coheave characteristics. From energy analysis of sigm formed by accumulation and submergence of floes and the approach flow characteristics was derived and found to fit the exparimental data satisfactorily. The relationship predicts that a stable jam cannot be formed when the approach flow velocity exceeds a certain value. This phenomenon was observed experimentally, and the measured maximum values of approach velocity were found to be in excellent agreement with the predicted values. In both studies on jam initiation and development, it was found that surface tension, and therefore the wetting properties of the material used for small laboratory floes, have a significant effect on the submergence velocity of small floes, and should be taken into consideration when small-cacle laboratory investigations of ice jam phenomena are conducted using floes made of artificial material. Experiments on compressive strength of floating, fragmented ice covers were conducted for ranges of cover length and cover thickness, using three different floe shapes and sizes. It was found that the compressive strength was inversely proportional to compressive strength and inversely proportional to compressive strength and independent of cover length. The effect of cover thickness and floe shape or size remains unclear partly because of the immitted ranges of thickness and floe size investigated and partly because of the experimental scatter in the results. CR 77-10

ICE PORCES ON VERTICAL PILES

Nevel, D.E., et al, Apr. 1977, 9p., ADA-051 770, 16

Perham, R.E., Hogue, G.B. 32-1145

ICE PRESSURE, PILE STRUCTURES, ICE BREAKING, ICE LOADS, ICE COVER THICKNESS, AIR TEMPERATURE.

NESS, AIR TEMPERATURE.

The amount of force that an ice sheet can apply to a vertical pile was tested by lowering a hydraulic ram device into a hole cut in an existing ice sheet. The device had a large base and shoved a relatively narrow vertical pile in a horizontal direction. Test variables were: pile widthe—1.5 in. to 36.7 in.; pile shapes—flat, round, 45 deg and 90 deg wedges; ice thickness—2.6 in. to 8.8 in.; and ram speed—0.07 in./sec to 18.75 in./sec; but not all shapes and sizes were tested at all speeds. Air tomperature was 20F (-6.7C). Forces and displacements were measured electronically. The findings are presented as a table of test results and as her graphs of the resultant ice pressures versus the pile width-to-ice-thickness ratio, pile width and hape combination and and pile velocity. The types of failures in the ice sheet were classified as crushing, splitting, buckling, bending, and croeping. The ice sheet generally withstood a high initial load followed by several lower peak load levels.

The maximum ice pressure measured was 610 psi for a 12.6-in.-diem round pile in 8.4-in.-thick ice. CR 77-11 CR 77-11

OBSERVATION AND ANALYSIS OF PROTECT-ED MEMBRANE ROOFING SYSTEMS. Schaefer, D., et al, Apr. 1977, 40p., ADA-040 220, 5

refs. Larsen, E.T., Aamot, H.W.C.

23-1146
ROOPS, HEAT LOSS, THERMAL INSULATION,
THERMAL PROPERTIES, COLD WEATHER
CONSTRUCTION, CLIMATIC FACTORS, TESTS, RFFECTIVENESS.

EFFECTIVENESS.

Two performance indicators, effectiveness and thermal efficiency, are defined and used to evaluate the year-round performance of three protected membrane roofs in Alsaka and New Hampshire. Effectiveness is a measure of the deviations of ceiling temperatures from a yearly average, with large deviation sindicating erratic performance in the roofing-insulation system. Thermal efficiency, the ratio of calculated heat loss to measured heat lose, is affected by climatic conditions such as rain, snow, solar radiation and wind. Thermal efficiency values of 100% or greater are possible since the calculated heat loss is based only on the inside and outside air temperature differences and the thermal properties of roof components. Results of the year-round evaluation indicate that the three protected membrane roofs generally have high values of both effectiveness and thermal efficiency. CR 77-12

CR 77-12 ROOF LOADS RESULTING FROM RAIN-ON-

Colbeck, S.C., May 1977, 19p., ADA-040 536, 11 refs. 32-1151

ROOFS, SNOW LOADS, LOADS (FORCES), DRAINAGE, RAIN, ANALYSIS (MATHEMAT-

A computer program to calculate the increased live load on a neow-covered roof due to rain-on-enow is given. For the 25-year rainstorm falling on a heavy snow load on a flat roof in Hanover, New Hampah..., an additional 98 kg/sq m (20 lb/sq ft) of liquid water is added to the live load. The additional load due to rain-on-snow is very sensitive to the snow properties and characteristics of the roof. A wide range of live loads is possible, depending on the particular circumstances.

CR 77-13

APPLICATIONS OF REMOTE SENSING IN THE BOSTON URBAN STUDIES PROGRAM, PARTS I AND IL.

Merry, C.J., et al, June 1977, 36p., ADA-049 285, ADA-049 286, 15 refs.

McKim, H.L.

32-2699 REMOTE REMOTE SENSING, AERIAL SUR URBAN PLANNING, UNITED STATES— SACHUSETTS—BOSTON. SURVEYS.

SACHUSETTS—BOSTON.

The cost effectiveness of remote sensing techniques was compared to that of the conventional techniques used by the U.S. Army Engineer Division, New England, in the Boston Harbor-Bestern Massachusetts Metropolitian Area study. A total of 6 level I, 18 level II, and 18 level III land use categories were mapped from NASA RB-57/RC-8 high altitude aircraft photography for six selected 7.5 minute quadrangles located in the Boston area. Watershed and political boundaries could not be mapped from the NASA photography. Impervious surfaces and curb lengths were mapped from low altitude aircraft photography obtained with a Zeiss RMK 15/23 camera system (measured scale 1:3500) for two sites in the Boston South and Newton quadrangles. The remote sensing procedures were not always tout-effective when compared to the conventional procedures, but they were always more accurate. Therefore, remote to the conventions processive, but they were always more accurate. Therefore, remote sensing techniques should be used and appropriate photographic resolution and scale factors taken into consideration when mapping land use, curb density and impervious surfaces for use in the STORM (storage, treatment, overflow, runoff) model.

CR 77-14 ICE BREAKUP ON THE CHENA RIVER 1975 AND 1976.

McFadden, T., et al, June 1977, 44p., ADA-043 070, Bibliography p.17-19. Collins, C.M.

32-1152

ICE BREAKUP, RIVER ICE, DAMS, BRIDGES, FLOOD CONTROL, ICE COVER THICKNESS, ICE VOLUME, UNITED STATES—ALASKA—CHENA BRIDE CHENA RIVER

CHENA RIVER.

The breakup of the Chena River was observed and documented during the spring of 1975 and 1976. This study attempted to determine the potential for damage to the proposed Chena River flood control dam from ice and debris during breakup. Results of this study were compared to those of a 1974 companion study. In 1975, ice thicknesses were determined to be 15% thinger than in 1974 and ice volume was 33% smaller. No major ice floos were observed in 1975 and no significant flooding occurred, although the approaches to a bridge at the damnite were eroded by debris and high water immediately after breakup. The 1976 breakup was milder than that of 1975. Misnor flooding in the lower river was caused by jamming of a few large ice pieces, but no property damage resulted.

CR 77-15 EXPERIMENTAL SCALING STUDY OF AN AN-NULAR FLOW ICE-WATER HEAT SINE Stubstad, J.M., et al, June 1977, 54p., ADA-045 869,

19 refs. Quinn, W.F. 32-1153

ICE WATER INTERFACE, HEAT TRANSFER, UNDERGROUND FACILITIES, HEAT RECOVERY, COOLING SYSTEMS, MODELS, COMPUT-**ERIZED SIMULATION.**

ERIZED SIMULATION.

A laboratory experimental study was conducted on a scale model of an annular flow ice-water heat sink to be used to store the waste heat produced in a hardenad defense installation operating in an isolated mode. The study examined: 1) scaling relationships for predicting the performance of prototype units using data from scale models, 2) the accuracy of a computer prediction technique developed during an earlier study, 3) the heat transfer phenomenon at the ice-water interface, and 4) some practical sepects related to the operation of a prototype installation. The scaling relationships and the computer program were found to be sufficiently accurate for use in developing a prototype ink design. During operation the scale model sink provided an almost constant low temperature source of coolant water for approximately one-half its useful life and thereafter behaved like an ordinary stored water reservoir type heat sink. No significant operational problems were discovered.

ICEBREAKER SIMULATION. Nevel, D.B., July 1977, 9p., ADA-044 109, 6 refs.

ICEBREAKERS, ICE BREAKING, ICE NAVIGA-TION, MATHEMATICAL MODELS, SIMULA-TION

A brief discussion is given of the ways an icebreaker breaks ice. Since the icebreaking process is so complex, the solution of a mathematical model does not appear to be feasible. As an alternative, it is suggested that physical models be used to design icebreakers. The appropriate scaling laws for physical models are developed and thris measured. Imministration "discussion!"

CR 77-17 ACCUMULATION ON OCEAN STRUC-TURES.

Minsk, L.D. Aug. 1977, 42p., ADA-044 258, Bibliog-

raphy p.17-19. 32-1155

32-1153 ICE ACCRETION, ICE FORMATION, SHIP IC-ING, ICE PREVENTION, ICE REMOVAL, SEA SPRAY, AIR TEMPERATURE, WATER TEM-PERATURE, WIND FACTORS, FREEZING POINTS.

PERATURE, WIND FACTORS, FREEZING POINTS.

A literature search was made for information on the accretion of ice on ocean structures and on methods for control. The bulk of the reports were in Russian, with some additional Japanese, British, American, Canadian, and Icelandic sources. Analysis of icing reports indicated that sea spray is the most important cause of ahip icing, with lesser amounts due to freezing rain, mow, and fog. Icing is a potential danger whenever air temperatures are below the freezing point of water and the sea temperature is 6C or lower. Theoretical work on the ice accretion process is discussed, and a method is suggested, based on Russian experiments, for calculating the sea spray accumulation rate for cylindrical and flat surfaces as a function of water source temperature, air temperature, and wind speed. Other factors that influence icing severity are ship size and configuration, angle between ship course and water heading, and ship speed. Icing in the north temperate latitudes generally occurs in the rear of barometric depressions. Maps showing limits of various degrees of cing severity are included. Atmospheric icing measurements on tall land-based structures are presented, and potential maximum accumulations estimated. Control measures are discussed, though no completely effective method is available. Mechanical (impaction) methods are the most common, but experiments have been conducted on heated, icephobic, and deformable surfaces, and with freezing point depressents. No device for the unequivocal measurement of ice accumulation is available, though some experimental methods are suitable for controlled testing; it is recommended that a device be developed.

CR 77-12

ICE ARCHING AND THE DRIFT OF PACK ICE THROUGH RESTRICTED CHANNEL Sodhi, D.S., Aug. 1977, 11p., ADA-044 218, 23 refs.

PACK ICE, SEA ICE, DRIFT, CHANNELS (WATERWAYS), ICE JAMS, MATHEMATICAL

MODELS.

MODELS.

Models originally developed to describe the arching and the movement of granular materials through hoppers or chutes are applied to the arching and drift of pack ice in straits and gulfs having lengths of 50 to 500 km. Verification of the usefulness of the models is attempted by making comparisons with ice deformation patterns as observed via satellite imagery in the Bering Strait region and in Amundhen Culf. The results are encouraging in that there is good correspondence between observed arching and lead patterns and those predicted by theory. In addition, values determined via the model for the angle of internal friction (approx 30 deg to 35 deg) and the cohesive strength per unit thickness (approx 2,000N/m) are similar to values obtained by other approaches. It is estimated that if the wind velocity parallel to the Bering Strait exceeds approx 6 m/s, there will be ice flow through the strait. to the Bering Strait exceeds ice flow through the strait.

CR 77-19
MECHANICS OF CUTTING AND BORING.
PART & DYNAMICS AND ENERGETICS OF
TRANSVERSE ROTATION ARCHINES. Mellor, M., Aug. 1977, 36p., ADA-045 127, 3 refs.

ROCK DRILLING, EXCAVATION, ICE CUTTING, DRILLS, PERMAFROST, DESIGN.

TING, DRILLS, PBRMAFROST, DESIGN.

The report deals with forces and power levels in cutting machines having a disc or drum that rotates about an axis perpendicular to the direction of advance. The forces on individual cutting tools are related to position on the rotor and to characteristics such as tool layout, roter speed, rotor size, machine advance speed, and rotor torque. Integration leads to expressions for force components acting on the rotor axis, taking into account tool characteristics, cutting depth of the rotor, and rotor torque. These provide estimates of tractive thrust and thrust normal to the primary free surface. For self-propelled machines, this leads to considerations of traction, normal reaction, weight and balance, and power/weight ratios. Specific energy consumption is analyzed and related to machine characteristics and strength of the material being cut. Power per unit working area is discussed, and data for existing machines are summarized. Power requirements for ejection of cuttings are analyzed, and the hydrodynamic resistance on underwater cuttings is treated. A number of worked examples are given to illustrate the principles discussed in the report.

INVESTIGATION OF AN AIRBORNE RESISTIVITY SURVEY CONDUCTED AT VERY LOW FREQUENCY.

Arcone, S.A., Aug. 1977, 48p., ADA-044 684, Bibliography p.44-45. 32-1158

ABRIAL SURVEYS, REMOTE SENSING, AIRBORNE RADAR, ELECTRICAL RESISTIVITY, GEOLOGIC STRUCTURES, VERY LOW FREQUENCY, GEOPHYSICAL SURVEYS, SUBSURFACE INVESTIGATIONS, UNITED STATES— MAINE-ALLAGASH.

MAINE—ALLAGASH.

An airborne survey of earth electrical resistivity, computed from the complex tilt of the electric field vector of a VLF (17.8 kHz) radio surface wave, has been studied. The survey was conducted at a 150-m mean flight altitude. The bedrock of the survey area was alate containing an igneous stock. Topography was found to distort the resistivity contours through its effect upon the vertical component of the electric field. At 300-m flight altitude most resistivity information was retained due to the deterioration of topographic influence. The phase of the tilt, which cannot be distinguished from the amplitude by an airborne antenna system, was determined from a ground survey of the surface impedance and was found to be an important influence on the airborne detection of high resistivity areas. The entire 150-m survey was reevaluated with topographic effects removed. The resolution of the igneous geology improved and several of these improvements were verified by the ground measurements.

CR 77-21

MID-WINTER INSTALLATION OF PROTECTED MEMBRANE ROOFS IN ALASKA.

Aamot, H.W.C., Aug. 1977, 5p., ADA-045 356, 2 refs.

32-1159 ROOFS, THERMAL INSULATION, COLD WEATHER CONSTRUCTION, COST ANALYSIS, ROOFS.

WEATHER CONSTRUCTION, COST ANALYSIS, UNITED STATES—ALASKA.

Cold weather limits the successful application of built-up roofing, but ofter a roof installation must be completed late in the fall or in the winter. The loose-laid protected membrane roof with a synthetic sheet membrane can be installed in the middle of the winter with complete reliability. A synthetic membrane is traditionally more expensive than built-up roofing (rising crude oil prices, however, have reversed this condition), but it has two special features besides its suitability for winter installation: it can be placed on a damp dect, if necessary, and, being loose-laid, it does not split because of deck movement. This report documents information on the installation of two roofs in Anchorage, Alaska, during January and February 1972, including a discussion of the necessary anow removal from the bare deck and the use of portable shelters for preparing the lap joints between sheets during very cold weather. The winter installation caused no special construction problems and the advantages of the synthetic membrane make it an attractive alternative to built-up roofing. The cost of loose-laid protected membrane roofs in Alaska was, in 1972, nearly \$300 per square (\$28/sq m), including insulation. Prices are rising as labor costs rise and as more insulation is specified. UNITED STATES—ALASKA.

CR 77-22

CR 7-42
BASEPLATE DESIGN AND PERFORMANCE:
MORTAR STABILITY REPORT.
Aitken, G.W., Aug. 1977, 28p., ADB-021 703L, 4 refs.
Distribution limited to U.S. Gov't. agencies only.

32-1237

MILITARY EQUIPMENT, SOIL STRENGTH, STATIC STABILITY, FOUNDATIONS.

STATIC STABILITY, FOUNDATIONS.

The results of field test programs conducted to evaluate the performance of several prototype baseplates on sand and clay soils are presented. One test series was accomplished to develop a possible alternative baseplate for the 60-mm Lightweight Company Mortar System (LWCMS). Three prototype baseplates were used in this series which resulted in design recommendations for a very lightweight, three-spade baseplate for use with the LWCMS. Another part of the program consisted of design and testing or prototype baseplate for use with an improved 81-mm mortar system. Design goals, which were verified in the test program, were to provide a displacement reduction of up to 30% and substantial reductions in tilt relative to the present M3 baseplate. Results obtained using a baseplate test fixture having spades of variable depth and configuration indicated that spade depth was very important on sand but of minor influence on clay. The influence of spade depth on displacement and tilt in both three- and four-spade configurations is covered in detail. Some data on the influence of socket height and perforation pattern on performance are also included.

CR 77-23

CR 77-23

COLLABORATION OF ARCHITECT A BEHAVIORAL SCIENTIST IN RESEARCH. Ledbetter, C.B., Aug. 1977, 8p., ADA-045 418, 33

32-1160

COLD WEATHER CONSTRUCTION, BUILDINGS, ENVIRONMENTS, PROFESSIONAL PER-SONNEL. RESEARCH PROJECTS, HOUSES

This report discusses the relationship between an architect and a behavioral scientist. Some of the discussion applies

to this cooperative work for design of buildings. The bulk, however, relates to the cooperation of architect and behavioral scientist while conducting research. Rxamples from collaborative research at Alaskan military installations are cited which demonstrate the roles and contributions of the two disciplines.

EVALUATION OF EXISTING SYSTEMS FOR LAND TREATMENT OF WASTEWATER AT MANTECA, CALIFORNIA, AND QUINCY, WASHINGTON. Iskandar, I.K., et al, Sep. 1977, 34p., ADA-045 357, 28

refs. Murrmann, R.P., Leggett, D.C.

32-1161

WASTE DISPOSAL, GROUND WATER, SOIL CHEMISTRY, LAND DEVELOPMENT, WATER TREATMENT, ENVIRONMENTAL IMPACT.

CHEMISTRY, LAND DEVELUTIMENT, WALLES TREATMENT, ENVIRONMENTAL IMPACT.

Wastewater disposal sites at Manteca, California, and Quincy, Washington, were evaluated for their currer: performance and for the long-term impact of wastewater application. These sites have been operated as slow-infiltration, land-disposal systems for up to 20 years. Current performance was evaluated in terms of water quality, while soil chemical parameters were measured to determine the effects of protonged wastewater application at the sites. No significant effects on the performance were found to be due to differences in pretreatment. A difference between the performances of the two sites was attributed mainly to management practices, site history and climatic differences. While leaching of nitrate was observed at both sites, the impact on groundwater quality generally was found to be within the accepted limits (less than 10 mg/1 of NO3-N). Leaching of phosphorus to a depth of 150 cm was found at both sites but was higher at Manteca. This was thought to be due to problems associated with crop menagement, land use, and mode and schedule of wastewater application. Total and extractable phosphorus increased in the surface soil layers with time. However, soil nitrogen appeared to decrease, probably because of mineralization.

Soile increase in exchangeable Na was noted, but not enough to produce alkaline or saline capacity increased. Some increase in exchangeable Na was noted, but not enough to produce alkaline or saline conditions. A drop in soil pH at Quincy after prolonged application is thought to have been due to removal of carbonates by leaching and by H+ from nitrification. If these disposal areas were managed as treatment sites, leachate quality should meet proposed Environmental Protection Agency guidelines for drinking waters.

DETECTION OF MOISTURE IN CONSTRUC-TION MATERIALS.

Morey, R.M., et al, Sep. 1977, 9p., ADA-045 353, 4

32-1164

CONCRETE CURING, CONSTRUCTION MATERIALS, MOISTURE, ROOPS, AIRBORNE RADAR, REMOTE SENSING, DETECTION, CONCRETE DURABILITY, RADAR ECHOES.

Results of a study to determine the feasibility of using an impulse radar to detect moisture variations in the built-up roof at CRREL and to monitor the curing of concrete are presented. The results indicate that impulse radas are presented. Increases some that impuse risc can be used to detect wide variations in roof moisture associate with built-up roof surface deterioration and that this techniq has the potential of providing a nondestructive test metho-for measuring the strength of concrete during curing.

INTERMITTENT ICE FORCES ACTING ON IN-CLINED WEDGES.

Tryde, P., Oct. 1977, 26p., ADA-046 590, 15 refs.

ICE LOADS, LOADS (FORCES), ICE PRESSURE, WEDGES, ANALYSIS (MATHEMATICS), THEO-RIRS.

A theory for ice forces acting on inclined wedges has been developed, thus making it possible to predict the magnitude of the intermittent ice forces from knowledge of the physical parameters of the system. The theory has been verified by model tests with artificial and natural ice.

OBSERVATIONS OF THE ULTRAVIOLET SPECTRAL REFLECTANCE OF SNOW.
O'Brien, H.W., Oct. 1977, 19p., ADA-046 349, 11

32-1166 SNOW OPTICS, REFLECTIVITY, SPECTROPHO-TOMETERS, ULTRAVIOLET RADIATION.

TOMBIERS, ULTRAVIOLET KADIATION.
The spectral reflectance of natural snow in the range of 0.20- to about 0.40-micron wavelengths was studied in the laboratory using both continuous spectral scanning and fixed bandpass measurements. White barium suthists pressed powder was used as a standard for comparison. The reflectance of fresh snow was found to be very high (usually searly 100%) and only weakly wavelength dependent from 0.24 micron to the visible range. In the 0.20- to 0.24-micron portion of the spectrum, the reflectance was found to be quite erratic. Possible reasons for the irregularities in reflectance measurements are discussed.

CR 77-28 FREEZE-THAW TESTS OF LIQUID DEICING CHEMICALS ON SELECTED PAVEMENT MATERIALS.

Minsk, L.D., Nov. 1977, 16p., ADA-051 771, 7 refs.

FREEZE THAW TESTS, CHEMICAL ICE PRE-VENTION, CONCRETE DURABILITY, BITUMI-NOUS CONCRETES.

Tests were conducted to assess the extent of surface degradation resulting from the application of non-chloride decing chemicals on three types of airfield pavements. The chemicals tested were proprietary mixtures of urea, formamide, and ethylene glycol; sodium chloride, distilled water, and dry specimens were used as controls and for comparison. Pavements included new and old specimens of dense-graded asphaltic concrete. Portland cement concrete specimens used were new and old, with and without air-entrainment. New and old tar rubber concrete specimens were also tested. Samples were subjected to up to 60 freeze-thaw cycles with deicing chemicals flooding their upper surface. Each specimen was rated on a scale of 0-5 after every five freeze-thaw cycles. All PCC specimens showed some surface degradation, whereas the dense- and open-graded asphaltic concretes were largely unaffected. Tests were conducted to as es the extent of surface degra

INTERNAL STRUCTURE OF FAST ICE NEAR NARWAHL ISLAND, BEAUFORT SEA, ALAS-KA.

Gow, A.J., et al, Oct. 1977, 8p., ADA-047 785, 13 refs. Weeks, W.F. 32-2727

FAST ICE, ICE STRUCTURE.

PASI ICE, ICE STRUCTURE.

Results of measurements of salinity, grain size, substructure dimensions and crystal fabrics of the undeformed 2.15-m-thick annual sea ice sheet near Narwhal Island, Alaska, are presented. A notable observation was the formation of a dominant c-axis horizontal structure in all ice below 14 cm, including transformation to a pronounced east-west alignment of the c-axes by a depth of 66 cm. This study confirms earlier reports of the occurrence of very strong horizontal c-axis alignments in arctic fast ice.

COMPUTER MODEL OF MUNICIPAL SNOW

Tucker, W.B., Nov. 1977, 7p., ADA-047 360, 10 refs. 32-1630

SNOW REMOVAL, URBAN PLANNING, COM-PUTERIZED SIMULATION.

PUTERIZED SIMULATION.

A general computer model to simulate municipal snow removal has been developed. Programs which aid in the routing of snowplows are a part of this package. Once vehicle routes are created, the simulation program can be used to assess situations varying both equipment and meteorological parameters. Time for each plow to complete its route is calculated. Considerations are made for the above variable parameters plus plowing windrow, route starting depth, overlapping truck routes and intersection delay time. The effects of storm length, snowfall rate and starting depth on total plowing time are examined in a test case.

ROOF MOISTURE SURVEY: TEN STATE OF NEW HAMPSHIRE BUILDINGS.

Tobiasson, W., et al, Dec. 1977, 29p., ADA-048 986, 5 refs.

Korhonen, C., Dudley, T. 32-2695

ROOFS, WATER CONTENT, INFRARED PHO-TOGRAPHY.

Ten roofs in Concord, New Hampshire, were surveyed for wet insulation using a hand-held infrared camera. Suspected wet insulation using a hand-held infrared camera. Suspected wet areas were marked on the roof with spray paint and roof samples were obtained to verify wet and dry conditions. Recommendations for maintenance and repair were made based on infrared findings, water contents, and visual examinations. An incremental economic study is presented to serve as a guide in determining the most cost-effective approach.

CR 77-32 HEAT TRANSFER OVER A VERTICAL MELT-ING PLATE.

Yen, Y.-C., et al, Dec. 1977, 12p., ADA-049 437, 11 nefs.

Hart, M.M.

32-2696
HEAT TRANSFER, CONVECTION, ICE MELTING, WATER FLOW, EXPERIMENTAL DATA.
An experimental study of forced convective heat transfer
over a vertical melting plate has been conducted. This
study covers water velocities ranging from 1.7 to 9.8 mm/s
and bulk water temperatures from 1.11 to 7.50C. The
experimental results are correlated in terms of Nusselt, Prandit
and Reynolds aumbers with a moderate correlation coefficient
of 0.843. The results are expected to be useful in predicting
the heat transfer characteristics of a much larger prototype
ice-water heat sink. 32-2696 ice-water heat sink

CR 78-01 AXIAL DOUBLE POINT-LOAD TESTS ON SNOW AND ICE.

Kovacs, A., Mar. 1978, 11p., ADA-053 321, 11 refs. 32-3535

ICE MECHANICS, SNOW MECHANICS, COM-PRESSIVE STRENGTH, INDEXES (RATIOS), STRAIN TESTS, ANTARCTICA—MCMURDO SOUND.

SOUND.

The results of axial double point-load tests on disk samples of snow and ice obtained from the area of McMurdo Sound, Antarctica, are presented. They show the effects of temperature, sample length, load point diameter and specific gravity on failure load. It was determined that 13 samples should be tested to obtain a representative mean strength index. The results show that the axial double point-load test has good possibilities as a rapid field test for determining the unconfined compressive strength of snow and ice but that further evaluation of the variables affecting test results must be made. (Auth.) (Auth.)

SOME ELEMENTS OF ICEBERG TECHNOLO-

Weeks, W.F., et al, Mar. 1978, 31p., ADA-053 431, 52

Mellor, M. 32-3536

ICEBERG TOWING, ICE (WATER STORAGE), ENGINEERING.

ENGINEERING.
Many of the technical questions relating to iceberg transport are given brief, but quantitative, consideration. These include icebergs at sea, towing forces and tug characteristics, drag coefficients, ablation rates, and handling and processing the icebergs at both the pick-up site and at the final destination in particular, the paper attempts to make technical information on glaciological and ice engineering aspects of the problem more readily available to the interested planner or engineer. Specific conclusions include: 1) No unprotected iceberg, no matter how long or wide, would be likely to survive the ablation caused by a long trip to low latitudes. 2) Icebergs that have a horizontal dimension exceeding 2 km may well be prone to breakup by long wavelength swells. 3) To avoid the dangers associated with an iceberg capsizing, the width of a 200-m-thick iceberg should always be more than 300 m. 4) For towing efficiency the length/width ratio of a towed iceberg should be appreciably greater than unity. 5) For a pilot project, the selected iceberg would have to be quite small, if for no other reason than the practical availability of tug power. (Auth.)

CR 78-03 BEARING CAPACITY OF RIVER ICE FOR VEHICLES.

Nevel, D.E., Apr. 1978, 22p., ADA-055 244, 7 refs. 33-2527

RIVER ICE. ICE STRENGTH. VEHICLES. FLOATING ICE.

The mathematical theory for the bearing capacity of river ice for vehicles is presented.

The floating ice aheet is assumed to have simple supports at the shore line. Solutions are presented for loads uniformly distributed over circular and rectangular areas. Numerical evaluations are made for a number of vehicles and the results presented in graphical

CR 78-04 COMPARISON BETWEEN DERIVED INTER-NAL DIELECTRIC PROPERTIES AND RADIO-ECHO SOUNDING RECORDS OF THE ICE SHEET AT CAPE FOLGER, ANTARCTICA. Keliher, T.E., et al, Apr. 1978, 12p., ADA-055 245, 17

refa Ackley, S.F.

32-4366

ICE SHEETS, ICE ELECTRICAL PROPERTIES, ICE PHYSICS, RADIO ECHO SOUNDINGS, DIE-LECTRIC PROPERTIES, ICE COVER THICK-NESS, ICE DENSITY, ANTARCTICA—FOLGER,

CAPE.

Measured physical properties of core to bedrock taken at Cape Folger, Bast Antarctica, are used to compute a profile of dielectric properties and from this, a depth-reflection coefficient profile for comparison with the observed radio-echo reflections. The measurements available on physical properties are: density variations, bubble size and shape changes, and crystal fabric variations. The close correspondence between the depths of the bubble shape changes (which are definitely deformational features), and the depths of the density variations, and between both of these and the radio-echo layers, indicates that deformational events in the ice sheet's history are represented by the variations in the physical property and associated radio-echo records. (Auth. mod.)

CR 78-05

VISCOELASTIC DEFLECTION OF AN INFI-NITE FLOATING ICE PLATE SUBJECTED TO A CIRCULAR LOAD.

Takagi, S., Apr. 1978, 32p., ADA-054 896, 19 refa. 32-4367

FLOATING ICE, PLATES, VISCOELASTICITY, LOADS (FORCES), ANALYSIS (MATHEMAT ICS).

The viscoelastic deflection of an infinite floating ice plate subjected to a circular load is solved, assuming the Maxwell-Voigt type four-element model. An effective method is developed for numerical integration of the solution integrals, of which each integrand contains a product of Bessel functions extending to infinity. The theoretical curve is fitted to the field data, but the material constants thus found varied

CR 78-06 SEGREGATION FREEZING AS THE CAUSE OF SUCTION FORCE FOR ICE LENS FORMA-

Takagi, S., Apr. 1978, 13p., ADA-055 780, 38 refs. For another version see 32-3470. 32-4368

ICE LENSES, ICE FORMATION, SOIL FREEZ-ING, GROUND ICE, FROST HEAVE, SOIL ME-CHANICS, MATHEMATICAL MODELS, FROZ-EN GROUND THERMODYNAMICS.

CR 78-07 IN-PLANE DEFORMATION OF NON-COAXIAL PLASTIC SOIL

Takagi, S., Apr. 1978, 28p., ADA-054 217, 28 refs.

THEORIES, SOIL CREEP, PLASTIC DEFORMA-TION, BOUNDARY VALUE PROBLEMS.

TION, BOUNDARY VALUE PROBLEMS.

The theory of non-coaxial in-plane plastic deformation of soils that obey the Coulomb yield criterion is presented. The constitutive equations are derived by use of the geometry of the Mohr circle and the theory of characteristic lines. It is found that, for solving a boundary value problem, the non-coaxial angle must be given such values that enable us to accommodate the presupposed type of flow in the given domain satisfying the given boundary conditions. The non-coaxial angle is contained in the constitutive equations as a parameter. Therefore, the plastic material obeying the Coulomb yield criterion is a singular material whose constitutive equations are not constant with material but are variable with flow conditions.

CR 78-08 INTERACTION OF A SURFACE WAVE WITH A DIELECTRIC SLAB DISCONTINUITY.
Arcone, S.A., et al, Apr. 1978, 10p., ADA-055 956, 15

Delaney, A.J. 32-4369 ICE ELECTRICAL PROPERTIES, DIELECTRIC PROPERTIES, WAVE PROPAGATION, ELECTRIC FIELDS, MICROWAVES, AIRCRAFT ICING, HELICOPTERS, ICE REMOVAL.

ING, HELICOPIERS, ICE REMOVAL.

The interaction of a 51-GHz transverse electric surface wave with a dielectric slab is experimentally investigated. The wave is initially supported by a dielectric substrate resting upon a metallic ground-plane. A slab, made of the same dielectric material as the substrate and variable in height; is then placed upon the waveguide. The results for a small slab sitting on the substrate showed that the discontinuity was a very inefficient launcher of reflected surface waves. Investigations of these reflections with a trough waveguide. was a very inefficient launcher of reflected surface waves. Investigations of these reflections with a trough waveguide showed that, for values of slab height comparable to the exponential decay height of the surface wave, the reflections remain very small. However, as the slab height is increased beyond the decay height, the reflected amplitude approaches the theoretical value for a plane wave reflected from the interface between sir and the same dielectric. The results are applicable to surface wave methods of microwave deicing of wings and helicopter rotors.

CR 78-09 FLEXURAL STRENGTH OF ICE ON TEMPER ATE LAKES—COMPARATIVE TESTS OF LARGE CANTILEVER AND SIMPLY SUPPORT-ED BEAMS

Gow, A.J., et al, Apr. 1978, 14p., ADA-054 218, 9

Ueda, H.T., Ricard, J.A.

LAKE ICE, FLEXURAL STRENGTH, STRESS CONCENTRATION, SUPPORTS.

CONCENTRATION, SUPPORTS.

Large, simply supported beams of temperate lake ice were found, generally, to yield significantly higher flexural strengths than the same beams tested in the cantilever mode. Data support the view that a significant stress concentration may exist at the fixed corners of the cantilever beams. Maximum effects are experienced with beams of cold, brittle ice substantially free of structural imperfections; for this kind of ice the strength difference factor, here attributed to the effect of stress concentrations, may exceed 2.0; that is, simply supported beams test a factor of 2 or more stronger than the same beams tested in the cantilever mode. In ice that has undergone extensive thermal degradation, the stress

concentration effect may be eliminated entirely. Simply supported beams generally yield higher strengths when the top surfaces are placed in tension. This behavior is attributed to differences in ice type; the fine-grained, crack-free top layer of snow-ice, which constituted up to 50% of the ice cover in the current series of tests, usually reacted more strongly in tension than the coarse-grained crack-prone bottom labe less.

CR 78-10

COMPRESSION OF WET SNOW

Colbeck, S.C., et al, Apr. 1978, 17p., ADA-055 246, 34

Shaw, K.A., Lemieux, G.

32-4370

WET SNOW, SNOW COMPRESSION, SNOW WATER CONTENT, VISCOSITY, SALINITY, SNOW MELTING, STRESSES, IONS.

SNOW MELTING, STRESSES, IONS.
The compressibility of wet snow is described in terms of pressure melting and nonlinear viacous deformation at grain contacts. The results of experiments with different salinities and liquid water contents are compared with computed densities. The decreasing compressibility of wet snow with increasing salinity and decreasing liquid content is quantified and explained. Simultaneous particle growth and the doubly charged layer at phase boundaries are included in the model. The results show that the density of wet snow increases approximately as a power of time but is highly dependent on the stress, initial particle size, liquid water content, and ionic impurity content of the snow.

CR 78-11

MECHANICS OF CUITING AND BORING. PART & DYNAMICS AND ENERGETICS OF CONTINUOUS BELT MACHINES.

Mellor, M., Apr. 1978, 24p., ADA-055 247. 32-4371

ROCK EXCAVATION, BOREHOLE INSTRU-MENTS, ROCK DRILLING, EXCAVATION, ICE CUTTING, MACHINERY, PERMAPROST, DE-SIGN.

The report deals with forces and power requirements for cutting machines of the belt type, as exemplified by large chain saws and isdder trenchers. The forces of single cutting tools are considered, and related to the overall forces on a cutter bar. Porces are related to power, and sources of loss are identified.

Tructive thrust and normal reaction and to assess the traction, weight and of loss are identified. Tractive thrust and normal reaction are analyzed and used to assess the traction, weight and balance factors for self-propelled machines. Specific energy consumption and performance index are treated, and concepts of power density and apparent belt pressure are introduced. Requirements for acceleration of cuttings are assessed, and the report concludes with a set of worked examples.

CR 78-12

REPETITIVE LOADING TESTS ON MEM-BRANE-ENVELOPED ROAD SECTIONS DUR-ING FREEZE-THAW CYCLES.

Smith, N., et al, May 1978, 16p., ADA-056 744, 15

Eaton, R.A., Stubstad, J.M.

32-4407
LOADS (FORCES), ROADS, FREEZE THAW CYCLES, LOW TEMPERATURE TESTS, SUBGRADE PREPARATION, WATERPROOFING,
SOIL WATER MIGRATION.

SOIL WATER MIGRATION.
Road test sections of membrane-enveloped silt and clay soils overlain with asphalt cement concrete were subjected to repetitive dynamic plate-bearing loadings to determine their strength variations during freeze-thaw cycles. The recoverable surface deformations in the load deflection bowl were continuously measured during the loading cycles and analyzed, using the Chevron layered elastic computer program to obtain the in situ resilient deformation modulus of the various section layers at different stages of the freeze-thaw cycles. The resilient stiffness of the pavement system (the total load per unit of resilient load plate deflection) was also calculated for the various freeze-thaw conditions. The modulus values of the asphalt cement concrete varied inversely with its temperature by an order of magnitude (90,000 psi to 1,300,000 psi). The resilient stiffness of the pavement system varied in the same manner by nearly a factor of cight (22.4 kips/in. to 1740.2 kips/in.). Despite the wide strength variations of the sections during freeze-thaw cycles, membrane-enveloped fine-grained soils can be utilized instead of granular materials as base and subbase layers in flexible pavements in cold regions where moisture migration is a major concern. Moisture migration did not occur at saturation levels up to 75%; thus there was no strength loss during thewing.

CR 78-13

PREFERRED CRYSTAL ORIENTATIONS IN THE FAST ICE ALONG THE MARGINS OF THE ARCTIC OCEAN

Weeks, W.F., et al, June 1978, 24p., ADA-059 024, 77

refs. Gow, A.J.

SEA ICE, FAST ICE, ICE CRYSTAL STRUCTURE, OCEAN CURRENTS.

Peld observations of the growth fabrics of the fast and near-fast ice along the coasts of the Beaufort and Chukchi Seas above that, at depths of more than 60 cm below the upper ice surface, the sea ice crystals show striking alignments

within the horizontal plane. In general, the c-axes of the crystals were aligned roughly E-W parallel to the coast. In the vicinity of islands the alignment roughly paralleled the outlines of the islands, and in narrow passes between islands the alignment paralleled the channel. Our observations, as well as similar observations made in the Kara Sea by Cherepanov, can be explained if it is assumed that the c-axes of the crystals are aligned parallel to the "long-term" current direction at the sea ice/sea water interface. The slignments are believed to be the result of geometric selection among the growing crystals, with the most favored orientation being that in which the current flows normal to the plates of ice that make up the dendritic ice/water interface characteristic of sea ice.

BUCKLING PRESSURE OF AN ELASTIC PLATE FLOATING ON WATER AND STRESSED UNIFORMLY ALONG THE PERIPHERY OF AN INTERNAL HOLE.

Takagi, S., June 1978, 49p., ADA-056 585, 10 refs.

FLOATING ICE, ICE STRENGTH, BOUNDARY VALUE PROBLEMS, ANALYSIS (MATHEMAT-ICS).

ICS).

The analytical solution and the numerical study of the eigenvalue problem for determining the buckling pressure of an infinite clastic plate floating on water and stressed uniformly along the periphery of an internal hole is presented. The boundary conditions considered are the clamped, sincular, and free-edge conditions. Small buckling pressure scoper only for the free-edge condition. The shape of the deflection for the free-edge condition suggests that buckling is an important mechanism of failure.

ON THE DETERMINATION OF HORIZONTAL FORCES A FLOATING ICE PLATE EXERTS ON A STRUCTURE.

Kerr, A.D., Aug. 1978, 9p., ADA-060 444, 26 refs. For this report from a different source see 32-4451. 33-1521

PLOATING ICE, ICE PRESSURE, LOADS (FORCES), OFFSHORE STRUCTURES, ICE (FORCES), STRENGTH.

STRENGTH.

This report first discusses the general approach for calculating horizontal forces an ice cover exerts on a structure. Ice force determination consists of two parts: (1) the analysis of the in-plane forces, assuming that the ice cover remains intact, and (2) the use of a failure criterion, since an ice force cannot be larger than the force capable of breaking up the ice cover. For an estimate of the largest ice force, an elastic plate analysis and a failure criterion are often sufficient. A review of the literature revealed that, the majority of the analyses, it is assumed that the failure load is directly related to a "crushing strength" of the ice cover. However, observations in the field and tests in the laboratory show that in some instances the ice cover fails by buckling. This report reviews the ice force analyses based on the buckling failure mechanism and points out their abortcomings. The report then presents a new method of analysis which is based on the buckling mechanism.

HYDRAULIC MODEL INVESTIGATION OF DRIFTING SNOW.

Wuebben, J.L., June 1978, 29p., ADA-059 175 33-1767

HYDRAULIC STRUCTURES, SNOWDRIFTS, MODELS, BOUNDARY VALUE PROBLEMS, SNOW FENCES.

SNOW FENCES.

A model investigation of drifting snow conditions was conducted in a hydraulic flume using a sand-water analog. Model results were evaluated to define modeling parameters that would allow quantitative correlation between necessured protocype drift conditions and the model. Models of the fence were constructed for three heights and two geometric scales. Comercic scaling was based on terrain roughness and boundary layer thickness considerations, while velocity scaling was based on particle fall velocity and threshold of motion characteristics. Simulation of the atmospheric boundary layer was found to be of primary importance. Velocity scaling analysis suggested the use of a 'significant wind' concept, based on a combination of velocity magnitude and frequency. Similarity of precipitation rate was not essential, and could be altered within limits to adjust the time scale.

SHORELINE CHANGES ALONG THE OUTER SHORE OF CAPE COD FROM LONG POINT TO MONOMOY POINT

Gatto, L.W., July 1978, 49p., ADA-060 297, 52 refs.

SHORELINE MODIFICATION, AERIAL SUR-VEYS, PHOTOINTERPRETATION.

VEYS, PHOTOINTERPRETATION.

This investigation utilized historical and recent aerial photographs and satellite imagery in 1) estimating changes in positions of the high-water line and sea cliff break and sea; in rates of accretion and/or erosion, and in volumes of transported sediment, and 2) providing a preliminary evaluation of the direction of littoral transport along the outer Cape Cod coast. This investigation has illustrated a photo interpretation technique that is useful in performing a recontainsance of coastal change. The data obtained from this method can be used to supplement those acquired by ground

surveys and are valid as first approximations for planning subsequent, more detailed surveys.

CR 78-18
ESTUARINE PROCESSES AND INTERTIDAL
HABITATS IN GRAYS HARBOR, WASHINGTON: A DEMONSTRATION OF REMOTE SENS-ING TECHNIQUES.
Gatto, L.W., July 1978, 79p., ADA-061 823, 49 refs.
33-1523

BESTUARIES, SHORELINE MODIFICATION, REMOTE SENSING, AERIAL SURVEYS, SPACE-BORNE PHOTOGRAPHY, TIDAL CURRENTS, SEDIMENTATION, MAPPING.

BORNE PHOTOUGRAPHY, IIDAL CURRENTS, SEDIMENTATION, MAPPING.

The primary objective of this project was to demonstrate the utility of remote sensing techniques as an operational tool in the acquisition of data required by the U.S. Army Corps of Engineers, Seattle District, in the Grays Harbor dredging effects project, and related projects. Aerial imagery was used to map surface circulation and suspended sediment patterns near the hopper dredge pump site at the harbor entrance and near pulpmill outfalls in Aberdeen, and to map the areal distribution and extent of intertidal habitats. The surface circulation maps, prepared from the serial photographs and thermal imagery, compared favorably with the large-scale circulation patterns observed in the Grays Harbor hydraulic model at the U.S. Army Engineer Waterways Experiment Station.

Of the imagery provided by NASA, the thermal imagery was more useful than the color of color infrared (CIR) photographs for mapping circulation, while the CIR photographs were more useful than the thermal imagery or the color photographs for mapping intertidal habitats. Current velocities estimated from dye dispersion patterns and drifting dye drogues were comparable at some locations to velocities measured by in situ current meters and in the hydraulic model. Based on a cursory evaluation of LANDSAT-1 imagery sequired in January, February, and October 1973, it had limited utility in providing data on surface circulation patterns in Grays Harbor.

CR 78-19

PRIMARY PRODUCTIVITY IN SEA ICE OF THE WEDDELL REGION.
Ackley, S.F., et al, July 1978, 17p., ADA-059 344, 24

Taguchi, S., Buck, K.R. 33-1524

SEA ICE, ICE CORES, BIOMASS, WEDDELL SEA.

rnymeat and biological measurements were made of aca ice cores taken from 685 to 785 in the Weddell Sea. Fluorescence measurements indicated an algal community that was strongly associated with salinity maxima within the ice. Maximum concentration of chlorophyll a ranged from 0.306 to 4.54 mg/stere. Comparisons with the water column standing crop indicated that the standing crop within the ice represents a minor but significant percentage of the total standing crop for the region. The ice algal community is apparently distinct from others that have been described for land-fast ice in McMurdo Sound, sea ice in the Arctic and pack ice off Bast Antarctica. The highest concentrations of biological material are found in the bottom or top of the sample in those regions, whereas the Weddell Sea samples are concentrated at intermediate depths (6.5 m to 2.15 m) within the ice. A qualitative model indicating the relationship between thermally-induced brine migration and subsequent algae growth is presented. This model indicates the distribution of algae within the ice is dependent on the unique thermal and physical setting for Weddell Sea pack ice where brine drainage processes are initiated by spring and summer warming, but are not carried through as completely as in other regions. (Auth.) Physical and biological measurements were made of sea ice cores taken from 685 to 785 in the Weddell Sea. Pluores-

MEASUREMENT AND IDENTIFICATION OF AEROSOLS COLLECTED NEAR BARROW, AT.ASEA

Kumai, M., July 1978, 6p., ADA-058 606, 9 refs.

33-1525
ABROSOLS, PARTICLE SIZE DISTRIBUTION, ELECTRON MICROSCOPY.

BLECTRON MICROSCOPY.

Measurements of the concentrations of Aitken nuclei in maritime sir were made near Barrow, Alaska, in June 1975, with a modified Nolan-Pollack small-particle detector. The concentrations varied from 50 to 300 particles/cu cm, depending upon meteorological conditions. The mean Aitken nuclei count was 100 particles/cu cm for diameters greater than .002 microns. Transmission electron micrographs of serosols in maritime air near Barrow were taken. The rate range was measured to be 0.01 to 2.5 microns in diameter, with the most frequently observed diameter being 0.04 microns. The volume of the maritime air nod the collection efficiency were measured. The serosol concentrations were found to be 76 to 101 particles/cu cm. The aerosol particles in the maritime air were identified by electron microscopy and selected area electron diffraction analysis. About 20% of the aerosol particles were identified, and 80% of the particles were too small for electron diffraction analysis.

CR 78-21 ANALYSIS OF THE MIDWINTER TEMPERA-TURE REGIME AND SNOW OCCURRENCE IN

Bileilo, M.A., et al, Sep. 1978, 56p., ADA-066 934. Appel, G.C. 33-4415

AIR TEMPERATURE, SNOWFALL, METEORO-LOGICAL DATA, WEATHER FORECASTING, STATISTICAL ANALYSIS.

STATISTICAL ANALYSIS.
This study investigates the possibility of providing estimates of the time of occurrence and length of the freezing season for any location in East and West Germany by using the average January sir temperature (AJAT) as an index. The results indicate that reliable values of the mean freezing index can be obtained from the AJAT relationships which are developed for Germany. This association is further verified using data from the northeastern part of the U.S., and the AJAT is then used to determine the average starting and ending dates (and hence the probable length) of the freezing season for stations in Germany. The AJAT and the average dates of snowfall occurrence for numerous locations in the U.S. and Germany are also correlated. Interrelationships between these parameters and the average number of days with snow on the ground for stations up to 3000 m in elevation in Germany are examined.

UNDERSEA PIPELINES AND CABLES IN POLAR WATERS

Mellor, M., Sep. 1978, 34p., ADA-086 161. 19 refs.

PIPELINES, TRANSMISSION LINES, HYDRAU-LIC STRUCTURES, DAMAGE, ENGINEERING, EXCAVATION, SEA ICE, SUBSEA PER FROST, ICE SCORING, POLAR REGIONS.

Special environmental factors that influence the design, laying and maintenance of undersea pipelines and cables in polar waters are described. Various approaches to the protection and maintenance of undersea pipermes and cables in polar waters are described. Various approaches to the protection of submarine pipes and cables are considered, and prime emphasis is given to burial techniques for shallow water. A wide range of methods for treaching and burying are discussed, and technical data are given.

INFLUENCE OF FREEZING AND THAWING ON THE RESILIENT PROPERTIES OF A SILT SOIL BENEATH AN ASPHALT CONCRETE PAVEMENT.

Johnson, T.C., et al, Sep. 1978, 59p., See also 32-3761. Cole, D.M., Chamberlain, E.J. 33-3128

BITUMINOUS CONCRETES, SUBGRADE SOILS, SOIL FREEZING, GROUND THAWING, ELAS-TIC PROPERTIES.

TIC PROPERTIES.

Stress-deformation data for silt subgrade soil were obtained from in-seitu and laboratory tests, for use in mechanistic models for design of pavements affected by frost action. Plate-bearing tests were run on bituminous concrete pavements constructed directly on a silt subgrade, applying repeated loads to the pavement surface while the silt was frozen, tawing, thawed, and fully recovered. Repeated-load laboratory triaxial tests were performed on the silt in the same conditions. Analysis of deflection data from the in-situ tests showed resilient moduli of the silt as low as 2000 kPs for the critical thawing period, and 100,000 kPs or higher when silt was fully recovered. Analysis of the laboratory tests, which gave moduli comparable to the latter values, showed that resilient modulus during recovery from the thaw-weakened condition can be modeled as a function of the changing moisture content.

PERFORMANCE OF THE ST. MARYS RIVER ICE BOOMS, 1976-77.

am, R.E., Sep. 1978, 13p., ADA-061 431, 5 refs. 33-1526

ICE BOOMS, ICE PRESSURE, ICE NAVIGATION, COLD WEATHER PERFORMANCE.

TION, COLD WEATHER PERFORMANCE.

The ice booms on the St. Marys River at Sault Ste. Marie, Michigan and Ontario, were operated a second winter, 1967-77, under colder conditions, with less water flow, lower water levels, and 25% fewer ships in the river than during the previous year. The ice cover behind the booms remained frozen to shore for longer periods, and the loads registered in the booms were relatively unaffected by ship passages compared with the previous year's activity. As in the previous year, most structural load changes took place in the west ice boom and were due to movements of the ice cover immediately upstream of the boom. The cover broke free from shore on three occasions: the first and third occasions were minor events, but on the second occasion the cover cracked free, the timbers remained frozed to it, and the boom structure became damaged by the subsequent ice activity. Three anchor line assemblies broke over a period of about 4 hours; the two latter breaks occurred while a ship was operating in the ice. These events point out several factors to be considered in ice booms, such as designing the booms to withstand the action of the solid ice cover as well as the fragmented ice cover, keeping the structures and their assembly simple, and inspecting components and assemblies carefully.

CR 78-25 RIVER CHANNEL CHARACTERISTICS AT SE-LECTED ICE JAM SITES IN VERMONT. Gatto, L.W., Oct. 1978, 52p., ADA-061 778, 30 refs. 33-1527

ICE JAMS, CHANNELS (WATERWAYS), REMOTE SENSING, PHOTOINTERPRETA-TION, TOPOGRAPHIC FEATURES, RIVER ICE. The objectives of this investigation were to describe characteristics and geographic settings of ice jam sites from serial photographic interpretation, to indicate which characteristics may be important in causing ice jams, and to suggest additional uses of serial photographa. Uncontrolled photomosaics of each site were assembled and major river characteristics were delineated on the photomosaics. Characteristics described include: man-made structures, falls, rapids, changes in channel depths, channel islands, mid-channel should be the property of the changes in channel depths, channel islands, mid-channel shoals or bars, river bed material, river sinuosity, meanders, floodplain width, riparian vegetation, and types of development on the floodplain. River channel widths were measured from the photographs along rivers where ground truth data were available for comparison. Lengths of channel riffles and pools were measured along the rivers where variations in river depths were evident on the photographs. Acrial photographs provide a regional perspective for evaluating channel characteristics at an ice jams site and for analyzing the geographic setting at each site during ice-free conditions. Photographs taken after ice jams have formed are useful in monitoring ice jam formation, in analyzing ice characteristics, and in documenting ice jam breakup and movement.

CR 78-26 ICE FOG SUPPRESSION USING REINFORCED THIN CHEMICAL FILMS

McFadden, T., et al, Nov. 1978, 23p., ADA-063 107,

Collins, C.M. 33-2526

ICE FOG, FOG DISPERSAL, CHEMICAL ICE PREVENTION.

PREVENTION.

Ice fog suppression experiments on the Fort Wainwright Power Plant cooling pond were conducted during the winters of 1974-76. Baseline information studies occupied a sizable portion of the available ice fog weather in 1974-75. Then hexadecanol was added to the pond and dramatically improved visibility by reducing fog generated from water vapor released by the pond at -14C. Although this temperature was not low enough to create ice fog, the cold vapor fog created was equally as devastating to visibility in the vicinity of the pond. During the winter of 1975-76, suppression tests were continued, using films of hexadecanol, mixes of hexadecanol and octadecanol, and ethyleus glycol monobutyl ether (BGME). Suppression effectiveness at colder temperatures was studied and limits to the techniques were probed. A reinforcing grid was constructed that prevented breakup of the film by wind and water currents. Lifetime tests indicated the BGME degrades much more alowly than either hexadecanol or the hexadecanol-octadecanol mix. The films were found to be very effective fog reducers at warmer temperatures but still allowed 20% to 40% of normal evaporation to occur. The vapor thus produced was sufficient to create some ice fog at lower temperatures, but this ice fog occurred less frequently and was more quickly dispersed than the thick fog that was present before application of the films.

EFFECT OF TEMPERATURE ON THE STRENGTH OF SNOW-ICE.

Haynes, F.D., Dec. 1978, 25p., ADA-067 583. 33-4414

SNOW STRENGTH, ICE STRENGTH, TEMPER-ATURE EFFECTS, TENSILE PROPERTIES, COMPRESSIVE STRENGTH.

Uniaxial compression and tension tests were conducted on polycrystalline snow-ice to determine the effect of temperature Test temperatures ranged from -0.1C polycrystalline anow-ice to determine the effect of temperature on its strength. Test temperatures ranged from 0.1C - 54C. Two machine speeds, 0.847 mm/s and 84.7 mm/s were used for the constant displacement rate tests. The compressive strength at 54C was about one order of magnitude higher than at 0.1C. The tensile strength at -18C was about 20% higher than at -0.1C. The initial tangent and 50% strength moduli are given for the compression tests, while the secant modulus to failure is given for the tension tests. The mode of fracture is discussed and the test results are compared with data from other investigations.

TUNDRA DISTURBANCES AND RECOVERY FOLLOWING THE 1949 EXPLORATORY DRILLING, FISH CREEK, NORTHERN ALAS-KA.

Lawson, D.E., et al, Dec. 1978, 81p., ADA-065-192, 67 refs.

Brown, J., Everett, K.R., Johnson, A.W., Komárková, V., Murray, D.F., Webber, P.J. 33-2739

HUMAN FACTORS, ENVIRONMENTAL IM-PACT, OIL SPILLS, DAMAGE, EXPLORATION, TUNDRA VEGETATION, REVEGETATION.

A 1949 drill site in the Naval Petroleum Reserve Number 4, Alaska, the Fish Creek Test Well 1, was examined in August 1977 to determine the disturbance caused by drilling activities and to analyze the response and recovery of the

vegetation, soils, permafrost, and surficial materials to that disturbance. Man-made disturbances include bladed and unbladed vehicular trails, a winter runway, excavations, pilings, remains of camp structures, steel drums and other solid waste, and hydrocarbon spills. The most intense and lasting disturbance to the vegetation, soils, and permafrost resulted from bulledozing of surface materials, diesel fuel spills, and trails developed by multiple passes of vehiciae. Thermokarst subsidence and thermal erosion, caused by increased thaw of permafrost due to disturbance, resulted in the development of a hummocky topography and water-filled depressions at the drill site. Some ice wedges disturbed in 1949 are still metting. Soil disturbance ranges from suinor modification to complete destruction of the soil morphology. The effects of hydrocarbon spills are still destretable in the soils. Little of the original vegetation remains in the intensety disturbed area, such as around the drill pad where a grass-dominated community prevails. After 28 years, the vegetation cover is closed over most mesic sites, shallow wet sites are well vegetated, and zeric sites, areas of diseel fuel spills and areas of severe erosion remain mostly bare. Pioneering plant species on bare, disturbed areas are members of mature vegetation assemblages from the undisturbed under which have high reproductive and dispersal capacities. A hypothetical model of natural revegetation and vegetation recovery is proposed. Vescular plants, bryophytes, and lichens were collected from the Fish Creek site area for the first time. Recommendations on cleanup and restoration of sites are presented. of sites are prese

CR 79-01 STUDY OF WATER DRAINAGE FROM CO-LUMNS OF SNOW.

Denoth, A., et al, Jan. 1979, 19p., ADA-066 935. Seidenbusch, W., Blumthaler, M., Kirchlechner, P., Ambach, W.

SNOW, WATER FLOW, DRAINAGE.

Experiments were conducted to study the flow of water through columns of homogeneous, repacked snow. The gravity flow theory of water flow through snow was verified, although possibly there is some dependence of the relative permeability on the state of metamorphism of the snow. Also, at very large values of saturation there may be some additional flow in saturated channels.

CR 79-02 EFFECT OF WATER CONTENT ON THE COM-PRESSIBILITY OF SNOW-WATER MIXTURES. Abele, G., et al, Jan. 1979, 26p., ADA-066 936, 6 refa. Haynes, F.D. 3650

SNOW WATER CONTENT, SNOW COMPRESSION, SNOW DENSITY, SNOW DEFORMA-TION.

The stress-density relationships of snow-water mixtures were investigated and are shown as functions of water content, initial snow-water mixture density and rate of deformation. An increase in water content in rate of decormation. An increase in water content is snow at a particular density or a decrease in the rate of deformation (or strain rate) decreases the stress, but apparently not the specific energy required to reach a specific mixture. e in the rate of density.

CR 79-03 BLANK CORRECTIONS FOR ULTRATRACE ATOMIC ABSORPTION ANALYSIS. Cragin, J.H., et al, Jan. 1979, 5p., ADA-066 979, 2

refs.

Quarry, S.T. 33-3166 WATER CHEMISTRY, CHEMICAL ANALYSIS, METALS, ATOMIC ABSORPTION.

MBTALS, ATOMIC ABSORPTION.

Both flame and flameless atomic absorption(AA) measurements require a distilled water blank correction. This correction is due to the enalyte contained in the distilled water used to prepare the standards and not, as commonly thought, to the reference "blank" used to zero the instrument. Flameless AA analyses of acidified beavy metal samples generally require additional corrections for the furnace deflection blank and for an acid blank. To prevent adsorption losses, the said blank should be determined by extrapolation of a series of acid dilutions in distilled water.

COMPUTER MODELING OF ATMOSPHERIC ICE ACCRETION. Ackley, S.F., et al, Mar. 1979, 36p., ADA-068 582, 25

Templeton, M.K. 33-3651

refs.

ACCRETION, METEOROLOGICAL FAC-TORS, ICE PHYSICS, HELICOPTERS.

TORS, ICE PHYSICS, HELICOPTERS.

A computer model is described to compute the amount of ice accretion on an object under a variety of initial conditions. Numerical techniques are best applied to these problems because of time dependent effects governing the amount of ice collected and the variety of initial conditions that can lead to ice accumulation. The helicopter rotor icing problem adds an additional complexity since the velocity along the rotor blade varies over a wide range, strongly affecting the amounts of ice collected at different blade positions. The physics of ice accretion is reviewed, and the accounting for the time-dependence in the computer model is described.

Some model results are presented

and indicate the dependence of ice accretion on velocity, droplet sizes, cloud liquid water content, and temperature for a cylindrical object of constant size.

GROUTING SILT AND SAND AT LOW TEM-PERATURES—A LABORATORY INVESTIGA-

n, R., Mar. 1979, 33p., ADA-068 741, 4 refs. 33-3867

TEMPERATURE TESTS, GROUTING, ICAL REACTIONS, COMPRESSIVE LOW STRENGTH.

This report presents data from an experimental program undertaken to develop information on proposed and existing chemical grout solutions to provide engineering properties in connection with grouting of soils in ambient temperatures of 39 F and below. Twelve grout solutions were investigated, including organic chemicals, sodium silicates, cements, and clay (beatonite).

CR 79-06

NONDESTRUCTIVE TESTING OF IN-SERVICE HIGHWAY PAVEMENTS IN MAINE. Smith, N., et al, Apr. 1979, 22p., ADA-069 817. Raton, R.A., Stubstad, J.

34-1843

34-1843 ROADS, COLD WEATHER TESTS, PAVE-MENTS, BEARING STRENGTH, FLEXURAL STRENGTH.

tive plate bearing (RPB) tests were at sections in state highways in M structive rep ducted on various test sections in state highwa during April 13-15, 1976. The RPB test consis during April 13-15, 1976. The RPB test consists of making resilient surface deflection measurements during repetitive loadings at various radii from the load plate. The pavement system stiffness was calculated, and the resilient modulus values for the various pavement layers were determined with the Chevron computer program for a layered elastic system. A thawed analysis using nondimensional deflection curves for the various sections provided a guide to the susceptibility of the pavement systems to surface failure and pothole development. Some comparisons between stabilized and nonstabilized aggregate and soil were made with calculated stiffness values. The moduli of the various materials were also compared. The residual surface deflections during testing for several pavement systems indicated ts of makins calculated stiffness values. The moduli of the various materials were also compared. The residual surface deflections during testing for several pevennent systems indicated a linear logarithmic relationship with number of load applications. A relationship between the modulus of the asphalt coment concrete pavement and pavement temperature was cement concrete pavement and pavement temperature was developed for the limited temperature range during the testing.

CR 79-07 PENETRATION TESTS IN SUBSEA PERMA-FROST, PRUDHOE BAY, ALASKA.
Blouin, S.E., et al, May 1979, 45p., ADA-071 999, 9

Chamberlain, B.J., Sellmann, P.V., Garfield, D.B.

SUBSEA PERMAPROST, BOTTOM SEDIMENT, PENETRATION TESTS, PENETROMETERS, PENETRATION TESTS, OFFSHORE DRILLING.

OFFSHORE DRILLING.

Sediments beneath the Beaufort Sea near Prudhoe Bay, Alaska, were probed at 27 sites using a static cone penetrometer to determine engineering properties and distribution of material types, including ice-bonded sediments. The probe provided both point and casing resistance data and thermal profiles. At five sites these data were correlated with information from adjacent drilled and sampled holes. These control data and the quality of the probe information permitted profiles of sediment type and occurrence of ice-bonded material to be developed along three lines that included various geological features and depositional environments. Material properties were quite variable in the upper 14 m of sediments probed. In general, softer, finer-grained sediments occurred to the upper layers, while penetration refusal was met in stiff gravels 10 to 12 m below the seabed. Seabed temperatures during the study were all below OC. However, because of uncertainties in freezing point values caused by brines, evaluation of the penetration resistance data was required to identify the occurrence of ice-bonded sediments. The coupling of thermal and penetration resistance data was required that seasonally ice-bonded sediments occurred where the sea ice froze back to or near the seabed. Deeper, perennially frozen sediments also appeared to be present at several probe sites. The penetration data obtained can be used to aid in the design of shallow and deep foundations in both ince-bonded and unfrozen subsea sediments. ents beneath the Beaufort Sea near Prudhoe Bay, Alaska

SEA ICE RIDGING OVER THE ALASKAN CON-TINENTAL SHELP.

Tucker, W.B., et al, May 1979, 24p., ADA-070 572, 24

Weeks, W.F., Frank, M.

SEA ICE DISTRIBUTION, PRESSURE RIDGES, ICE DEFORMATION, SURFACE ROUGHNESS, PROFILES, LASERS, MATHEMATICAL MOD-ELS, STATISTICAL ANALYSIS, REMOTE SENS-ING, FORECASTING.

See ice ridging statistics obtained from a series of laser surface roughness profiles are examined. Each set of profiles consists of six 200-km-long flight tracks oriented approximately perpendicular to the coastline of the Chukchi and Beaufort

Seas. The flights were made in February, April, August, and December 1976, and one additional profile was obtained north of Cross Island during March 1978. It was found that although there is a systematic variation in mean ridge height (h) with season (with the highest values occurring in late winter), there is no systematic spatial variation in at a given time. The number of ridges/km is also high during the late winter, with the highest values occurring in the Berter and Cross Island profiles. In most profiles, the ice 20 to 60 km from the coast is more highly deformed than the ice either neaver the coast or further seaward. The Wadhams model for the distribution of ridge beights gives better agreement with observed values in the highest of the spatial recurrence frequency of large pressure ridges are made by using the Wadhams model. Estimates of the spatial recurrence frequency of large pressure ridges are made by using the Wadhams model and also by using an extreme value approach. In the latter, the distribution of the isrgest ridges per 20 km of leser track was found to be essentially normal. Wadhams' distribution consistently predicts slightly larger ridge sails than does the extreme value approach.

CR 79-89 SEDIMENTOLOGICAL ANALYSIS OF THE WESTERN TERMINUS REGION OF THE MATANUSKA GLACIER, ALASKA.

Lawson, D.E., May 1979, 112p., ADA-072 000, Refs. p.109-112.

GLACIAL DEPOSITS, GLACIAL GEOLOGY, SEDIMENT TRANSPORT, GLACIAL TILL.

SEDIMENT TRANSPORT, GLACIAL TILL. Sedimentation at the terminus of the Matanuaka Glacier has been found to be primarily subserial in a 100- to 300-m wide, ico-cored zone paralleling the edge of the active ice. Certain physical and chemical characteristics of the ice and debris of the superglacial, englacial and basal zones of the glacier indicate the debris of the basal zone, the primary source of sediment, is entrained during freeze-on of meliwater to the glacier sole. Till formation results from the melting of buried ice of the basal zone. Meltout till inherits the texture and particle orientations of basal ice debris; other properties are not as well preserved. Most deposits result from resedimentation of till and debris by sediment gravity flows, meltwater sheet and rill flow, slump, spall, and for ablation. Depositional processes are interrelated in the process of backwasting of ico-cored alopes. Sediment flows are the primary process of resedimentation. Their physical characteristics, multiple mechanisms of flow and deposition, and characteristics of their deposits vary with the water content of the flow mass. Deposits of with the water content of the flow mass. Their physical characteristics, multiple mechanisms of flow and deposition, and characteristics of their deposits vary with the water content of the flow mass. Deposits of each process are distinguished from one another by detailed analysis of their internal organization, geometry and dimen-sions, and the presence of other internal and related external features. Genetic facies are defined by these characteristics. CR 79-10

ULTRASONIC VELOCITY INVESTIGATIONS OF CRYSTAL ANISOTROPY IN DEEP ICE CORES FROM ANTARCTICA.

Kohnen, H., et al, May 1979, 16p., ADA-071 451, 23 refs.

Gow, A.J. 33-4204

ICE SHBETS, GLACIER FLOW, ICE CORES, ICE CRYSTAL STRUCTURE, ICE ACOUSTICS, ANISOTROPY, WAVE PROPAGATION, ULTRA-SONIC TESTS, ICE CRYSTAL SIZE, SHEAR PROPERTIES, ANTARCTICA—BYRD STATION, ANTARCTICA—LITTLE AMERICA STATION. PROPERTIES, ANTARCTICA—BYRD STATION, ANTARCTICA—LITTLE AMERICA STATION. Lo cores from Byrd Station and Little America V have been used to test an ultrasonic technique for evaluating crystal anisotropy in the Antarctic Ice Sheet. P-wave velocities measured parallel and perpendicular to the vertical axes of cores from the 2164-m-thick ice sheet at Byrd Station have yielded results in excellent agreement with the observed c-axis fabric profile and with the in-situ P-wave velocity profile measured parallel to the bore hole axis. Velocity differences in excess of 140 m/s for core samples from deeper than 1300 m attest to the strong single pole clustering of crystallographic c-axes about the vertical especially in the zone from 1300-1800 m. Such oriented structure is compatible only with strong horizontal shearing in the zone. The existence in an ice sheet of widespread shearing several hundred meters above its bed raises serious questions as to the validity of current concepts of the flow of large ice masses that tend to gloss over or ignore crystal alignments of this magnitude. The ultrasonic technique has proven to be a fast and powerful tool for determining crystal fabrics in ice sheets. Results from Byrd Station and Little America V, together with fabric data from several other locations in Bast Antarctics, suggest that crystal orientations within the Antarctic Ice Sheet tend to be characterized by either single or multi-pole clustering of c-axes about a vertical symmetry axis.

CR 79-11 SNOWPACK OPTICAL PROPERTIES IN THE INFRARED.

erger, R.H., May 1979, 16p., ADA-071 004.

34-1366 SNOW OPTICS, SNOW DENSITY, LIGHT SCAT-TERING, REFLECTIVITY.

A theory of the optical properties of snow in the 2-20 microns region of the infrared has been developed. Using this theory, it is possible to predict the absorption assattering coefficients and the emissivity of snow, as function

of the snow parameters of grain size and density, for densities between 0.17 and 0.4 g/cu. cm. The absorption and acattering coefficients are linearly related to the density and inversely related to the average grain size. The emissivity is independent of grain size and exhibits only a weak dependence.

POINT SOURCE BUBBLER SYSTEMS TO SUP-PRESS ICE.

Ashton, G.D., May 1979, 12p., ADA-071 038, 8 refs. 33-4224

ICE REMOVAL, BUBBLES, ICE MELTING, HEAT TRANSFER, WATER FLOW, AIR TEM-PERATURE, PILES, OFFSHORE STRUCTURES, COMPUTERIZED SIMULATION.

COMPUTERIZED SIMULATION.

An analysis of a point source bubbler system used to induce local melting of an ice cover is presented. The analysis leads to a numerical simulation programmed in FORTRAN which may be used to predict the effectiveness of such systems. An example application is presented using a typical record of average daily air temperatures. The FORTRAN program for the point source simulation as well as a FORTRAN program for line source systems are included in the Amendity.

CR 79-13

TURBULENT HEAT TRANSFER IN LARGE AS-PECT CHANNELS

Haynes, F.D., et al, May 1979, 5p., ADA-071 003, 6

Ashton, G.D. 33-4136

HEAT TRANSFER, CHANNELS (WATER-WAYS), ICE WATER INTERFACE, TURBULENT FLOW, ICE COVER EFFECT, MATHEMATICAL MODELS, WATER TEMPER-ATURE.

ATURE. Heat transfer in turbulent flow was measured in a rectangular channel with a width of 0.254 m and a flow depth of 0.0254 m. Correlations between the Nusselt and Reynolds numbers are given for a range of 3.02x1000 is less than Re is less than 2.236x10,000. A Prandtl number range of 9.30 is less than or equal to 12.28 for water was used in the tests. The results are compared with those of other investigations and show that some well-known correlations. edict the heat transfer by about 35%

CR 79-14

ACCELERATED ICE GROWTH IN RIVERS. Calkins, D.J., May 1979, 5p., ADA-071 015, 5 refs. 33-4137

FRAZIL ICE, RIVER ICE, ICE GROWTH, ICE COVER THICKNESS, HEAT TRANSFER, SLUSH, POROSITY, MATHEMATICAL MODELS.

Solid ice growth rates due to the presence of frazil alush beneath the ice cover have been shown to be greater than the so-called static growth. The frazil alush reduces the beneath the ice cover have been shown to be greater than the so-called static growth. The frazil stuht reduces the effective heat of ice solidification and the frazil particles freeze into the interstitial water. Prosented which clearly show the effect of frazil ice porosity on ice cover growth rates and the numerical model using air temperature as the major input is compared with field data on ice thickness in a small river laden with frazil ice beneath its cover.

CR 79-15

DETECTION OF ARCTIC WATER SUPPLIES WITH GEOPHYSICAL TECHNIQUES. Arcone, S.A., et al, June 1979, 30p., ADA-072 157, 38

Delaney, A.J., Sellmann, P.V.

WATER SUPPLY, DETECTION, GROUND WATER, MAGNETIC PROPERTIES, RADIO WAVES.

This report discusses the application of several modern geo-physical techniques to groundwater exploration in areas of permafrost. These methods utilize the principles of magnetic induction and radiowave surface impedance in the 10- to 400 kHz band, the techniques of impulse and side-looking radar in the 50- to 10,000 MHz band, and also some optical radar in the 50- to 10,000 MHz band, and also some optical techniques using imagery obtained from a satellite, all for detecting free water under an ice cover in shallow, almost completely frozen lake basins, and thaw zones within lake beds, stream channels, and in permathost in general. The radar studies demonstrate the use of these techniques for determining depth of free water and ice cover thickness on lakes and rivers.

CR 79-16

CONSTRUCTION AND PERFORMANCE OF MEMBRANE ENCAPSULATED SOIL LAYERS IN ALASKA.

Smith, N., June 1979, 27p., ADA-073 531, 17 refs.

34-134
SOIL FREEZING, COLD WEATHER TESTS,
FROST PROTECTION, SOIL WATER, WATERPROOFING, FROST HEAVE.

In 1973 two membrane encapsulated soil layer (MESL) test sections were constructed into existing gravel surfaced roads at Elimendorf AFB and at Ft. Wainwright in Anchorage and Pairbanka, Alaska, respectively. The Elmendorf AFB MESL contains a sity clay soil and the Ft. Wainwright MESL contains a nonplastic silt. Both sections were con-

structed at soil moisture contents of approximately 2% to 3% below optimum for the CE-12 compactive effort. There were no indications of soil moisture migration during freezing in either test section, and after-thaw field California Bearing Ratio values were nearly equal to values measured before freezing. There is prowing evidence of a slight increase in the overall soil moisture content in the Elmendorf AFB MESL, possibly from moisture entering through the single layer polyethylene sidewalls which were not treated with asphalt emulsion. There is good evidence that the membrane of the same section might have received damage during a soil sampling operation which allowed localized moisture infiltration. A two-layer polyethylene membrane used in the Pt. Wainwright MESL is considered a more positive moisture barrier than the single sheet and a justifiable added cost for permanent construction. structed at soil moiss 3% below and cost for permanent construction.

CR 79-17

ROOF RESPONSE TO ICING CONDITIONS. Lane, J.W., et al, July 1979, 40p., ADA-074 477, 12

Marshall, S.J., Munis, R.H. 34-625

ROOPS, THERMAL CONDUCTIVITY, ICING, MELTING, SLOPE ORIENTATION.

MBLTING, SLOPE ORIENTATION.

Six test roofs of two different slopes—16.3 deg and 39.8 deg, and three different roof coverings—asphalt shingles, codar shingles, and corrugated aluminum sheeting, were constructed at USACRREL, Hanover, New Hampshire, and were instrumented with thermocouples, heat flow meters, and calibrated gutters. Measurements were recorded for the winters of 1971-72 and 1972-73. The degree of icing and the chronological changes in the snow cover were recorded on 35-mm Kodachrome slides. It was found that eave icing is a sensitive function of the slope, roof covering composition, and solar radiation. The effects of wind were not investigated; the data were screened to remove all information corresponding to windspeeds over 8 km/h. In order of increasing tendency to form ice dams on the caves, the roofs were high-slope asphalt, high-slope codar, high-slope aluminum.

CR 79-18

INSULATING AND LOAD-SUPPORTING PROPERTIES OF SULFUR FOAM FOR EXPEDIENT ROADS IN COLD REGIONS.

Smith, N., et al, Sep. 1979, 21p., ADA-074 694, 6 refs. Pazsint, D.A. 34-742

ROADS, THERMAL INSULATION, CELLULAR MATERIALS, BEARING STRENGTH, FREEZE THAW CYCLES.

THAW CYCLES.

Temperatures of the subgrade and of sulfur foam insulation test sections in an expedient road were monitored with thermocouples to document freezing and thawing conditions. Vehicular trafficking was conducted on a limited basis to determine the load supporting capabilities of the foam. The sulfur foam, placed directly under a prefabricated surface mat, was found to be unsuitable for use as an expedient thermal insulation and traffic load supporting material, primarily because of its low tensile strength and high brittleness. The insulating value of sulfur foam produced by the batch process in the field was about one-half that of extruded polystyrene, meaning double the thickness for equal protection against thaw. nst thaw.

CR 79-19

CRITICAL VELOCITIES OF A FLOATING ICE PLATE SUBJECTED TO IN-PLANE FORCES AND A MOVING LOAD.

Kerr, A.D., Aug. 1979, 12p., ADA-075 455, 6 refs.

FLOATING ICE, DYNAMIC LOADS, VELOCI-TY.

The critical velocities of loads moving over floating ice plates have been determined by several authors. In all these analyses it was assumed that the in-plane force fleid in the ice cover is zero. However, due to constrained thermal strains, in-plane forces do occur in the field. The purpose of the present paper is to determine their effect upon the critical velocities of the moving loads. It is shown that a uniform compression force field reduces the critical velocity, whereas a tension force has the opposite effect

VOLUMETRIC CONSTITUTIVE LAW FOR SNOW SUBJECTED TO LARGE STRAINS AND STRAIN RATES.

Brown, R.L., Aug. 1979, 13p., ADA-075 474, 10 refs. 34-913

SNOW DEFORMATION, SNOW COMPRESSION, VOLUME, STRAINS, STRAIN TESTS, DYNAMIC LOADS, TRACKED VEHICLES.

NAMIC LOADS, TRACKED VEHICLES.

A volumetric constitutive equation was developed to characterize the behavior of snow subjected to large compressive volumetric deformations. By treating the material as a suspension of air voids in a matrix material of polycrystalline ice, a rate-dependent volumetric constitutive law was formulated and found to accurately predict material response to pressure loads for a wide range of load rates. Comparison of the theory with shock wave data was not considered in this paper, sithough the constitutive law appears to be valid for such load situations. One application to oversnow

mobility of tracked vehicles was made. In this case, power requirements due to snow compaction were calculated parametrically in terms of vehicle speed, track loading, and snow

CR 79-21 TOWING SHIPS THROUGH ICE-CLOGGED CHANNELS BY WARPING AND KEDGING. Mellor, M., Sep. 1979, 21p., ADA-077 801, 6 refs. 34-1380

Mentor, M., Sep. 1979, 21p., ADA-077 801, 6 rens.
34-1380
CHANNELS (WATERWAYS), ICE COVER, ICE PRESSURE, SHIPS, ANCHORS.
The report studies the question of whether Great Lakes freighters could move effectively through ice-clogged channels with the sid of tows provided by warping or kedging systems.
Ten operational concepts are outlined, and their advantages and disadvantages are noted. The crushing resistance of floating brash ice is then analyzed. The neutral, active and passive states of stress for laterally confined brash ice are considered, and the resistance to horizontal thrusting by a smooth vertical wall is calculated for cobesionless brash ice, and for ice in which there is finite cohesion between the ice fragments. The thickening of the ice cover in the vicinity of a "pusher" and the formation of pressure ridges are analyzed in order to estimate the amount of pile-up that can occur against a ship hull. The analysis then moves on to consideration of ship resistance by brash ice, taking into account crushing resistance at the bow, angential friction at the bow, and the hull friction aft of the bow section. Comparisons are made between thrust from the ship's screws and the calculated ice resistance. The next section of the report estimates the force requirements from the ship's acrews and the calculated ice resistance. The next section of the report estimates the force requirements for a warping or kedging system in terms of throut augmentation for existing vessels. Tow cable requirements are given, and estimates are made for cable anchors and for anchorage of underwater structures. The force and power requirements for winches and windlasses are given, the practical problems involved in the pickup or transfer of cables are mentioned, and the report concludes with a brief appraisal. The conclusion is that a simple warping tug system is appropriate for a full-scale experiment, a chain ferry with auxiliary barge seems attractive for an operational system, and a chain ferry plow may be an efficient way to clear ice from channels.

CR 79-22 CRYSTAL ALIGNMENTS IN THE FAST ICE OF

ARCTIC ALASKA Weeks, W.F., et al, Oct. 1979, 21p., ADA-077 188, 9

refs.

Gow, A.J. 34-1379

ICE CRYSTAL STRUCTURE, FAST ICE, ICE CRYSTAL GROWTH, SEA ICE, OCEAN CUR-RENTS.

RENTS.
Field observations at 60 sites located in the fast or near-fast ice along a 1200-km stretch of the north coast of Alaska between Bering Strait and Barner Island have shown that 95% of the ice samples exhibit striking c-axis alignments within the horizontal plane. Such alignments were usually well developed by the time the ice was 50 cm thick. In all cases the degree of preferred orientation increased with depth in the ice. Representative standard deviations around a mean direction in the horizontal plane are commonly less than 10 deg for samples collected near the bottom of the ice. The general patterns of the alignments support a correlation between the preferred c-axis direction and the current direction at the ice/water interface. A comparison between c-axis alignments and spot current measurements made at 42 locations shows that the most frequent current direction coincides with the mean c-axis direction. Such alignments are believed to be the result of geometric selection with the most favored orientation being that in which the current flows normal to the (0001) plates of ice that compose the dendritic sea ice/sea water interface.

EFFECTS OF SEASONAL CHANGES AND GROUND ICE ON ELECTROMAGNETIC SUR-

VEYS OF PERMAPROST.
Arcone, S.A., et al, Oct. 1979, 24p., ADA-077 903.
Delaney, A.J., Sellmann, P.V.

34-2363 PERMAFROST DISTRIBUTION, ELECTRO-MAGNETIC PROSPECTING, SEASONAL VARIATIONS, GROUND ICE.

VARIATIONS, GROUND ICE.

The performance of surface impedance and magnetic induction electromagnetic subsurface exploration techniques was studied seasonally at various sites in Alaska where permafrost and massive ground ice occurred. The methods used have greatest sensitivity within about 20 m of the surface and are, therefore, most applicable for shallow subsurface investigations. The selection of study sites was based on anticipated contrasts in electrical resistivity between ground ice and conjunct and adjacent earth materials. A magnetic induction instrument, using a separation of 3.66-m between the transmitter and receiver antennas, in general was able to detect near-surface zones of massive ice and to provide data regarding permafrost distribution in both the Pairbanks and Prudhoe Bay areas.

ANTIFREEZE-THERMODRILLING FOR CORE THROUGH THE CENTRAL PART OF THE ROSS ICE SHELF (J-9 CAMP), ANTARCTICA. Zotikov, I.A., Nov. 1979, 12p., ADA-078 748, 11 refs.

ICE SHELVES, ICE CORES, DRILL CORE ANAL-

YSIS.

By using a new thermocoring technique, a hole was successfully drilled through the 416-m thickness of the Ross Ice Shelf at J-9 Camp. This report provides a description of the drill and an socount of this drilling project. A provisional examination of the core shows the ice shelf to consist of 410 m of snow and glacial ice undertain by 6 m of sea ice formed by direct freezing of sea water to the bottom of the Ross Ice Shelf. (Auth.)

CHARGED DISLOCATION IN ICE: 1. EXIST-ENCE AND CHARGE DENSITY MEASURE-MENT BY X-RAY TOPOGRAPHY.

Itagaki, K., Nov. 1979, 12p., ADA-078 775, 23 refs. ICE ELECTRICAL PROPERTIES. BLECTRIC

CHARGE, DISLOCATIONS (MATERIALS), X RAY ANALYSIS, ICE CRYSTAL STRUCTURE.

The motion of dislocations in single crystal ice under an electric field was observed by using X-ray topographic methods. Electric charge density on these dislocations was deduced from the amplitude and length of the dislocation segment under the known AC electrical field. In linear charge density, considerable variation is possible, depending on the effective field acting on the dislocation lines.

CR 79-26 LAKE CHAMPLAIN ICE FORMATION AND ICE FREE DATES AND PREDICTIONS FROM METEOROLOGICAL INDICATORS.

Bates, R.E., et al, Nov. 1979, 21p., ADA-079 640, 11 refs.

Brown, M.-L.

34-1745 LAKE ICE, ICE FORMATION, ICE BREAKUP, METEOROLOGICAL DATA, PERIODIC VARIA-

TIONS.

A 19-yr record of the annual closing and opening dates of operation of the Lake Champlain ferry at Grand Isle, Vermont, which are controlled by the lake's ice cover, was made available to CRREL. These navigation records accurately approximated the freeze-over and breakup dates for the ferry crossing area between Gordon Landing, Vermont, and Cumberland Head, New York. When compared statistically with water temperature and climatological data for the same years at nearby Lake Champlain locations, the dates allowed securate predictions of ice formation. From nearby sir temperature records, cumulative freezing degreeday (C) cuives were plotted for each year of record, and ice formation dates and standard deviations were predicted with considerable accuracy. Several methods of predicting ice formation on Lake Champlain were attempted. The most accurate approach used a combination of water temperatures and freezing degree-days. The influence of wind speed on ice cover formation and prediction are also discussed in the report. in the report.

CR 79-27

SOME BESSEL FUNCTION IDENTITIES ARIS-ING IN ICE MECHANICS PROBLEMS. Takagi, S., Nov. 1979, 13p., ADA-078 709, 10 refs.

34-1609 ICE MECHANICS, ANALYSIS (MATHEMAT-

ICS).

ICS).

Some Bessel function identities found by solving problems of the deflection of a floating ice plate by two different methods are rigorously proved.

The master formulas from which all the identities are derived are in a Fourier reciprocal relationahip, connecting a Hankel function to an exponential function. Many new formulas can be derived from the master formulas. The analytical method presented here now opens the way to study a hitherto impossible type of problem-the deflection of floating elastic plates of various shapes and boundary conditions.

CR 79-28

ELECTRON MICROSCOPE INVESTIGATIONS OF FROZEN AND UNFROZEN BENTONIT Kumai, M., Nov. 1979, 14p., ADA-078 776, 12 refs.

ELECTRON MICROSCOPY, FROZEN GROUND PHYSICS, SOIL STRUCTURE, CLAY SOILS

PHYSICS, SOIL STRUCTURE, CLAY SOILS. Transmission and scanning electron micrographs of Umist bentonite revealed thin, mica-like grains with irregular shapes. Most of the bentonite showed electron diffraction ring patterns, but some showed hexagonal net patterns as well as ring patterns. The lengths of the unit cells were calculated to be 5.18 Å along the a-axis and 8.97 Å along the b-axis. Semiquantitative analyses were made using an energy dispersive spectrometer. Common elements such as Si, Ti, Al, Fe, Mg, Na and K were determined. The molecular ratio of SiO2-Al2O3 was calculated to be 492:100 for the bulk sample, indicating that Umist bentonite is similar in most respects to Wyoming bentonite, and is classified as a montmorillonite. The microstructure of frozen Umist bentonite was observed at a specimen temperature of -100C using a scanning electron

screecepe equipped with a cold stage. Prozen bentonite and gregated ice patterns formed from wet bentonite were exam-sed using an X-ray map and Si X-ray line scan. Sublimation recesses of ice in the frezen bentonite were observed at speci-ten temperatures of -60 and -80C. After sublimation of the se, the bentonith displayed a honeycomb structure. It was nachided that the freezing-sublimation cycle in frozen soil toreasses the normeshifty of water vanor due to the threesees the permeshility of water vapor due to the three-ensional structure of the coagulated clay formed by

CR 79-29

ANALYSIS OF PLASTIC SHOCK WAVES IN SNOW.

Brown, 1 34-2528 , R.L., 1979, 14p., ADA-080 051, 12 refs.

WAVE PROPAGATION, SNOW DEFORMA-TION, SHOCK WAVES, LOADS (FORCES), ANALYSIS (MATHEMATICS).

ANALYSIS (MATHEMATICS).

As analytical study of the propagation of shock waves in show was carried out to evaluate the response of medium density snow to high rates of loading. One solution was developed for steady shock waves; this resulted in calculation of pressure jump, density jump and stress wave speed. Correlation with available experimental data was found to be good. Nonsteady shock waves were also considered in order to evaluate wave attenuation rates in snow. Very good. Nonsteady anock waves were also considered in order to evaluate wave attenuation rates in snow. Very few data were available to compare with the analytical results, so no definite conclusions on the part of the study could be made. The results show, however, that shock waves that produce plastic deformation attenuate at extremely high rates and that differences in pressure between two waves are quickly eliminated within a short distance. Calculations were also made to evaluate the effect of wave fromenous were also made to evaluate the effect of wave frequency on attenuation rates. The results show that, for plastic waves, frequency is not a predominant factor for determining attenuation rates. (Auth.)

CIR 79-30 SUPPRESSION OF RIVER ICE BY THERMAL RFFLUENTS.

Ashton, G.D., Dec. 1979, 23p., ADA-080 654, 5 refs. 34-2283

RIVER ICE, ICE CONTROL, THERMAL DIFFU-SION, THERMAL POLLUTION, HEAT TRANS-FER.

FER.
The ice suppression resulting from discharge of warm water into rivers during winter is analyzed with emphasis on two different cases. In Part 1, the case of a thermal effluent fully mixed across the flow section is analyzed to include the effects of unsteadiness in the effluent temperature and the meteorological variations. The location of the ice edge is determined either by O C water temperature criterion or an equilibrium ice melting analysis. The choice of the applicable criterion emerges naturally from the analysis, even though the location of the ice edge may be considerably different when a steady-state analysis is done. In Part 2, the case of a side discharge of heated effluent is analyzed, also in an unsteady manner, and the effects of transverse dispersion are included in the analysis. Comparisons are made in Parts 1 and 2 to limited field data that are available. CR 80-01

IMPROVED ENZYME KINETIC MODEL FOR NITRIFICATION IN SOILS AMENDED WITH AMMONIUM. 1. LITERATURE REVIEW

Leggett, D.C., et al, Jan. 1980, 20p., ADA-082 303, Refs. p.18-20. Iskandar, I.K. 35-2583

35-2585

WASTE TREATMENT, WATER TREATMENT, SOIL CHEMISTRY, SOIL MICROBIOLOGY,

GROWTH.

Previous research indicates that nitrification in pure cultures can be represented by Michaelis-Menten kinetics. However, the effects of temperature and especially pH have not been treated systematically in any of the previous reviews of the subject. The work reported here is an attempt to synthesize reported temperature and pH effects on nitrification and nitrifier growth rates. In addition we attempt to extend the principles of microbial kinetics to soils. Our work indicates that pH effects can be interpreted mechanistically as inhibitions by hydrogen and hydroxyl ions, nitrous acid, and ammonia. These are incorporated into the Michaelis-Menten expressions. It is also our observation that ammonium oxidizers in natural habitats are characterized by lower Michaelis constants than pure cultures. This is significant particularly in terms of their growth and activity in acid soils. Alternatively, we speculate that profiferation of ammonium oxidizers in acid soils is due to spatial heterogeneity of "pH" at the microsite level.

CR 80-02 WINTER THERMAL STRUCTURE, ICE CONDITIONS AND CLIMATE OF LAKE CHAMPLAIN. R.E., Jan. 1980, 26p., ADA-082 304, 7 refs.

33-2383
LAKE ICE, ICE CONDITIONS, THERMAL REGIMS, ICE FORMATION, ICE THERMAL PROPERTIES, WATER TEMPERATURE, METEOROLOGICAL DATA, WINTER, THERMISTORS, STEPAN PROBLEM.

Winter thermal structure and ice conditions in the land-fast ice cover of Lake Champlain were studied in detail for the winters of 1975-76 and 1976-77. The lake was instrumented to a depth of 9.5 m with a string of highly

calibrated thermistors attached to an ice mooring system and connected to a data logger at Shelburne Point, Vermont, during the winter of 1975-76 and at Gordon Landing on Grand lake, Vermont, during 1976-77. This data logger automatically recorded water temperatures from the surface of the lake through snow, ice and water vertical profiles to the bottom of the lake every four hours. Pertinent meteorological parameters are presented for the appropriate messurement sites during the two winter periods, November 775-April 776, and November 776-April 77. Computations were made of freezing degree days for both winters and correlated with ice formation dates. Predictions of ice growth, using the Stefan equation with an empirical coefficient, were correlated with actual ice growth. Documentation was made of the Lake Champlain Transportation Company's first attempt at wintertime navigation by ferry from Gordon Landing, Vermont, to Cumberland Head, New York, in a land fast ice cover during one of the coldest winters of this century.

CR 80-03

REVEGETATION AT TWO CONSTRUCTION SITES IN NEW HAMPSHIRE AND ALASKA. Pajazzo, A.J., et al, Jan. 1980, 21p., ADA-082 305, 30

Rindge, S.D., Gaskin, D.A. 35-2586

REVEGETATION, SEWAGE DISPOSAL, LAND RECLAMATION, GRASSES, GRAVEL, ORGAN-IC SOILS, SLUDGES, NUTRIENT CYCLE.

Revegetation techniques were investigated for gravel so in cold regions. Two gravel soil test sites were establish in Hanover, New Hampshire, and Fairbanks, Alaska. Durin During three growing seasons, we studied the applicability and cost effectiveness of various nutrient sources and mulch materials. The nutrient sources included sewage sludge (40, 60 and 80 tons/acre) and commercial fertilizer (at 200, 400 and 600 lb/scre). The mulching materials were wood fiber mulch with various types of tackiffers, pest moss, and sewage sludge. The effects of refertilization during the second growing season were also studied.

CR 20-04 ENVIRONMENTAL ANALYSIS OF THE UPPER SUSITNA RIVER BASIN USING LANDSAT IM-ACERY.

Gatto, L.W., et al, Jan. 1980, 41p., ADA-084 900, 52

Merry, C.J., McKim, H.L., Lawson, D.B.

ABRIAL SURVEYS, REMOTE SENSING, SPACE-BORNE PHOTOGRAPHY, LANDSAT, MAP-PING, PHOTOINTERPRETATION, SPACE-CRAFT, RIVER BASINS, ENVIRONMENTS, CRAFT, RIVER BASINS, ENVIRONMENTS, UNITED STATES—ALASKA—SUSITNA RIVER. UNITED STATES—ALASKA—SUSITNA RIVER. The primary objectives of this study were to 1) prepare a map from Landsat imagery of the Upper Susitna River Basin drainage network, lakes, glaciers and snowfields, 2) identify possible faults and lineaments within the upper basin and within a 100-km radius of the proposed Devil Canyon and Watana dam sites as observed on Landsat imagery, and 3) prepare a Landsat-derived map showing the distribution of surficial geologic materials and poorly drained areas. The BROS Digital Image Bahancement System (BDIES) provided computer-enhanced images of Landsat-1 scene 5470-19560. The BDIES false color composite of this scene was used as the base for mapping drainage network, lakes, glaciers and snowfields, six surficial geologic materials units and poorly drained areas. Some single-band and other color composites of Landsat images were used during interpretation of Landsat images without using computer analysis, serial photographs, field data, or published reports.

CR 80-05

CR 20-05

ASPHALT CONCRETE FOR COLD REGIONS: A COMPARATIVE LABORATORY STUDY AND ANALYSIS OF MIXTURES CONTAINING SOFT AND HARD GRADES OF ASPHALT CEMENT.
Dempsey, B.J., et al, Jan. 1980, 55p., ADA-082 198, 39 refs

Ingersoll, J., Johnson, T.C., Shahin, M.Y.

35-2587

BITUMENS, BITUMINOUS CONCRETES, PAVE-MENTS, CEMENT ADMIXTURES, TENSILE PROPERTIES, CRACKING (FRACTURING), STRAIN TESTS, THERMAL EFFECTS, VISCOSI-TY, TRAFFICABILITY.

TY, TRAFFICABILITY.

Pavements containing soft asphalt cement have been shown in the past to be less susceptible to low-temperature contraction cracking, but more susceptible to low-temperature contraction cracking, but more susceptible to traffic-load-associated distress in warm weather, than pavements with harder asphalt cements. This research comprised laboratory testing to determine the properties of asphalt-aggregate mixtures containing three grades of saphalt-caggregate mixtures containing thermally induced distress and traffic-associated distress. From the results it is concluded that only the softest asphalt cement tested (AC 2.5) would perform satisfactorily in a cold climatic zone. The moderately soft (AC 3) and moderately hard (AC 20) asphalt cements showed little susceptibility to thermal cracking in a moderate and a warm climatic zone respectively. The AC 2.5 and AC 5 asphalts are not recommended for use in warm climates, however, owing to increased susceptibility to rutting under traffic.

MAXIMUM THICKNESS AND SUBSEQUENT DECAY OF LAKE, RIVER AND FAST SEA ICE IN CANADA AND ALASKA.

Bilello, M.A., Feb. 1980, 160p., ADA-084 488, 57 refa.

ICE COVER THICKNESS, ICE MELTING, ICE DETERIORATION, LAKE ICE, RIVER ICE, SEA ICE, FAST ICE, AIR TEMPERATURE, ICE FORE-CASTING

CASTING.

Weekly measurements of the thickness of lake, river and fast sea ice made over a period of 10 to 15 years at 66 locations in Canada and Alaska are analyzed, and the portion of the data relating to maximum ice thickness and docay (i.e. the decrease in ice thickness) is examined. Ice thickness curves revealed individual patterns of ice decay, and comparisons between locations disclosed major contrasts in the amount of ice accretion and the times of maximum ice and ice learance. Although many factors affect the ice decay process, this study investigates in detail the effect of thawing temperatures. Concurrent measurements of the air temperature at each location made it possible to analyze the relationship between accumulated thawing degree-days (ATDD) and ice cover decay. Other factors affecting ice ablation and breakup, such as snow-ice formation, snow cover depth, solar rediation and wind are also discussed.

CIR 80-07

WASTEWATER TREATMENT IN COLD RE-GIONS BY OVERLAND FLOW. Martel, C.J., et al, Feb. 1980, 14p., ADA-084 489, 16

Jenkins, T.F., Palazzo, A.J.

34-325 WASTE TREATMENT, WATER TREATMENT, IRRIGATION, COLD WEATHER PERFORMANCE, ENGINEERING, SOIL CHEMISTRY,

Primary effluent, secondary effluent (package extended aeration plant effluent with BOD's often greater than 30 mg/liter) and tapwater were applied to separate sections of a pilot-scale overland flow site in a cold regions environment. The average application rate for each section was 5.0 cm (2.0 mi.) per week. Performance was evaluated for one year, May 1977 to June 1978. Results of this study demonstrated in.) per week. Performance was evaluated for one year, May 1977 to June 1978. Results of this study demonstrated that overland flow can renovate both primary and secondary effluent during spring, summer and fall seasons. However, during winter, runoff water quality from the primary section contained almost no pollutants during its entire operation. Ammonia was the easiest form of nitrogen to remove and nitrate was the most difficult. Rainstorms did not cause a "flushing" effect. However, ammonia and nitrate concentrations in the runoff increased during snowmelt. The forage yield from the primary and secondary sections was almost twice that of a typical New Hampshire hayfield. Westerwater application during winter caused only minor cases of plant injury. Based on these results, a minimum of 30 days of storage is recommended if overland flow is used to treat primary effluent, the number of storage days predicted by EPA-1 computer program appears to be adequate.

ANALYSIS OF THE PERFORMANCE OF A 140-FOOT GREAT LAKES ICEBREAKER: USCGC KATMAI BAY.

Vance, G.P., Feb. 1980, 28p., ADA-084 736, 8 refs.

ICEBREAKERS, BUBBLES, PROTECTIVE COAT-INGS, ICE COVER THICKNESS, ICE FRICTION, ICE STRENGTH.

ICE STRENGTH.
This report presents the results of the tests on the new U.S. Coast Guard 140-ft icebreaker Katmai Bay (WTGB-101) in the level plate ice and brash ice in Whitefish Bay and the St. Marys River. The results indicate that the vessel can penetrate 22 in. of level freshwater ice with in. of brash ice in a continuous mode and at lesst 30 in. of plate ice by backing and ramming. The installed bubblet system decreased the required power of the vessel from 10 to 30% in brash ice and 25 to 35% in level ice. The low friction coating appears to be effective in decreasing the friction factor when it remains intact; when it peels off, it appears to make conditions worse than plain paint. An average dynamic friction factor of 0.15 could be used over the entire hull for these tests.

HIGH-EXPLOSIVE CRATERING IN FROZEN AND UNFROZEN SOILS IN ALASKA

Smith, N., Feb. 1980, 21p., ADA-084 702, 8 refs. 34-3326

FROZEN GROUND MECHANICS, EXPLOSION EFFECTS, SEASONAL FREEZE THAW, TALIKS, EXCAVATION, TESTS.

EXCAVATION, 1831S.

Explosive cratering tests were conducted in seasonally frozen and thawed gravel at Pt. Richardson near Anchorage, Alaska, and in seasonally frozen and thawed silt overlying permafrost and in silt permafrost at Pt. Wainwright near Pairbanks, Alaska. Explosive charge weights ranged from 26 to 3120 lb, and charge burial depths ranged from about 3 to 40 ft. The cube root of the charge weight scaling was used to determine maximum scaled crater dimensions and optimum

scaled depth of burial of the charge. Test results for frozen and thawed gravel were essentially the same because of the low moisture content and the relatively shallow depth of freezing (5 to 6 ft). The optimum depth of burial of the charge for maximizing the apparent radius and depth and the true radius was about 1.8 times the cube root of the charge weight for both the frozen and thawed conditions. In seasonally frozen silt overlying a talk and silt permafrost, the maximum scaled crater dimensions and optimum scaled burial depths of the charge were smaller than for the thawed condition except for the true crater dimensions. The characters of the charge were smaller than for the thawed condition except for the true crater dimensions. condition except for the true crater dimensions. The chan-neling of energy in the tails produces maximum crater dimen-sions and an optimum burial depth for the true crater that is larger than for the thawed condition. The results for the homogeneous silt permatrost were very similar to the frozen gravel results, with much smaller maximum crater dimensions and smaller optimum charge burial depths than for the thawed silt overlying permatrost.

MATHEMATICAL MODEL TO CORRELATE FROST HEAVE OF PAVEMENTS WITH LABORATORY PREDICTIONS.

Berg, R.L., et al, Feb. 1980, 49p., ADA-084 737, 67

Cuymon, G.L., Johnson, T.C.

34-3200

MATHEMATICAL MODELS, FROST HEAVE, PROST PENETRATION, HEAT TRANSPER, SOIL WATER MIGRATION, PAVEMENTS, COMPUTERIZED SIMULATION, LABORATORY TECHNIQUES, FORECASTING.

RI IECTINIQUES, FORECASTING.

A mathematical model of coupled heat and moisture flow in soils has been developed. The model includes algorithms for phase change of soil moisture and frost heave and permits several types of boundary and initial conditions. The finite element method of weighted residuals (Galerkin procedure) was chosen to simulate the spatial regime, and the Crank-Nicholson method was used for the time domain portion of the model. To facilitate evaluation of the model, the time were essentially decompled; moisture fluxes were essentially decompled; moisture heat and moisture fluxes were essentially decoupled; moisture flux was then simulated socurately, as were best flux and frost heave in a laboratory test. Comparison of the simulated and experimental data illustrates the importance of unsaturated and experimental data illustrates the importance of unsaturated hydraulic conductivity. It is one parameter which is difficult to measure and for which only a few laboratory test results are available. Therefore, unsaturated hydraulic conductivities calculated in the computer model may be a significant source of error in calculations of frost heave. The algorithm is the contractive of the contractive and overharden was incompared to the contractive and the cont source of error in calculations of frost heave. The algorithm incorporating effects of surcharge and overburden was inconclusively evaluated. Time-dependent frost penetration and frost heave in laboratory specimens were closely simulated with the model. After 10 days of simulation, the computed frost heave was about 2.3 cm vs 2.0 cm and 2.8 cm in two tests. Frost penetration was computed as 15 cm and was measured at 12.0 cm and 12.2 cm in the two laboratory samples after 10 days.

ROOF LEAKS IN COLD REGIONS: SCHOOL AT

CHEVAK, ALASKA.
Tobiasson, W., et al, Apr. 1980, 12p., ADA-084 914.

34-3327

ROOFS, LEAKAGE, BUILDINGS, MELTWATER, SNOW ACCUMULATION, CONDENSATION, SUBPOLAR REGIONS.

SUBPOLAR REGIONS.
Four types of roof leaks occurred at a new school building in Chevak, Alsaka: 1) blowing snow entered the roof through eave vents and then melted, 2) stush and ice in roof valleys caused meitwater to overflow the valley flashing and run into the building, 3) water entered at a roof wall intersection and 4) in many areas water entered through gaps in the sloping plywood deck. Sealing the eave vents made it impossible for blowing snow to enter the roof at the eaves. Electric heat tapes eliminated the valley icing problems. Missing flashing was responsible for the roof-wall intersection leaks. The absence of a vapor barrier in the roof was the cause of many leaks. It was recommended that the roof be repaired from the exterior by removing component elements down to the plywood deck, installing an adhered continuous vapor barrier and reassembling the roof. An alternative roof cladding of composition shingles was discussed as was conversion to a "cold roof." The roof was repaired and modified following recommendations, and problems appear to have been solved.

CR 80-12 SIMPLIFIED MODEL FOR PREDICTION OF NITROGEN BEHAVIOR IN LAND TREAT-MENT OF WASTEWATER.

Selim, H.M., et al, Apr. 1980, 49p., ADA-085 191, 23 refs.

Iskandar, I.K. 34-3263

WASTE TREATMENT, WATER TREATMENT, NUTRIENT CYCLE, SOIL CHEMISTRY.

NOIRIENT CYCLE, SOIL CHEMISTRY.

A simplified model for simulation of nitrogen transformations and transportation in land treatment of wastewater is presented. The purpose of the model is to predict the behavior of NH4-N and NO3-N in the soil profile in land treatment systems. The program is based on the solution of the transfert soil water flow equation simultaneously with the equations describing the transformation, transport, and plant uptake of nitrogen in the soil. The program is valid

for uniform as well as multilayered soil profiles and can be adapted to incorporate various nitrogen transformation mechanisms and boundary conditions. The model can be used as a tool to predict the fate of nitrogen in land treatment systems. Model sensitivity to changes in the rate of nitrification, ammonium ion exchange, and rate of plant uptake of nitrogen is also described. Description of the computer program, the program listing, and an example of input data are presented.

CR 80-13 FRACTURE BEHAVIOR OF ICE IN CHARPY IMPACT TESTING. Itagaki, K., et al, June 1980, 13p., ADA-089 920, 17

35-973

ICE CRACKS, FRACTURING, IMPACT TESTS, TEMPERATURE EFFECTS, DOPED ICE, ICE COMPOSITION, ICE CRYSTAL STRUCTURE.

COMPOSITION, ICE CRYSTAL STRUCTURE. Specimens prepared from various types of ice without introducing excessive defects were tested at temperatures ranging from -2 to -190C. These tests indicated slightly higher Charpy values at lower temperatures and in more highly dispersed material concentrations. Three modes of fracture occurred during testing. Depending on the temperature and the material composition, either of the first two modes of macure, will appear and will show a normal frequency distribution of Charpy values in each type of ice. The third mode, fracture from both ends, which frequently occurred in the (NH4F) doped ice, gave Charpy values two to five times higher than the mean value for normal fracture. It can, therefore, be concluded that certain types of doping can alter the mode of fracture, through which drastic modifications of impact resistance may be possible.

GEOBOTANICAL ATLAS OF THE PRUDHOE BAY REGION, ALASKA.
Waiker, D.A., et al, June 1980, 69p., Refs. p.45-47.
Everett, K.R., Webber, P.J., Brown, J.
35-2150

JS-213U TUNDRA, GEOMORPHOLOGY, PERMAFROST, SOILS, VEGETATION, LANDFORMS, ECOSYS-TEMS, MAPS, PLANTS (BOTANY), ENVIRON-MENTS, PHOTOGRAPHY, ECONOMIC DEVEL-OPMENT, UNITED STATES—ALASKA— PRUDHOE BAY.

PRUDHOE BAY.

This atlas illustrates the interrelationships among the landforms, solls and vegetation of a portion of the Arctic Coastal
Pisin of Alsaka. The Prudhoe Bay region is dominated
by an alkaline peaty coastal tundra, a type that has not
been intensively studied. Porty-two vegetation communities, thirteen major landforms, and eight soil types are described. Several of the plant communities and one soil,
the Pergelic Cryoboroll, have not been described previously.
The vegetation is discussed with respect to three important
predicts temperature, soil pH and soil moisture. Other
aspects of the Prudhoe Bay environment, including geology,
permsfrost, and winter and tammer climate, are discussed
and illustrated. Also included are historical descriptions
of the development of the oilfield and of selected scientific
investigations in the Alsakan Arctic. Master maps present
the landforms, soils and vegetation of a 145-sq km portion
of the oilfield road network at a scale of 1:12,000. Derived
geobotanical special purpose maps, useful for land-use planning
and management of the coopystem, are explained and several
examples are shown for a 3.6 sq km portion of the oilfield.

CR 80-15 TIME CONSTRAINTS ON MEASURING BUILDING R-VALUES. Flanders, S.N., June 1980, 30p., ADA-089 712, 18

55-1998
COLD WEATHER CONSTRUCTION, CONSTRUCTION MATERIALS, THERMAL PROPERTIES, THERMAL CONDUCTIVITY, BUILDINGS, HEAT FLUX, TIME FACTOR, COMPUTER APTICATIONS ANALYSIS MATHEMATICS).

PLICATIONS, ANALYSIS (MATHEMATICS).

PLICATIONS, ANALYSIS (MATHEMATICS). This report discusses the time constraints on measuring the thermal resistance (R-value) of building components. Temperature changes on either side of a building component neutrum neasurement accuracy. Long measurement times and measurement times corresponding to a consistent diurnal cycle can be satisfactory; however, individual temperature changes cause significant error for shorter measurement periods. This report shows how to scale the thermal properties of individual constituent materials in a building element to determine its characteristic thermal time constant. The report then demonstrates the size of measurement error resulting from a variety of changes in temperature with representative walls of different time constants.

MORPHOLOGY AND DISTRIBUTION OF THE ACANTHOECIDAE (CHOANOFLAGELLATA)
FROM THE WEDDELL SEA DURING THE AUS-

TRAL SUMMER, 1977.
Buck, K.R., July 1980, 26p., ADA-090 680, 35 refs. 35-1721

PLANKTON, MARINE BIOLOGY, SEA ICE DISTRIBUTION, OCEAN ENVIRONMENTS, ICE EDGE, CRYOBIOLOGY, ANTARCTICA—WED-

DELL SEA.

Eight species of foricate choanoflagellates (Acanthoecidae) were observed in samples obtained from the Weddell Sea during the austral summer, 1977. Habitats in which choanoflagellates were found included the water column, the edges of ice floes, ponds on ice floes, and the interiors of ice floes. The presence of choanoflagellates within the ice floes. The presence of choanoflagellates within the ice floes are the season of the community, the ice algae and the bacteria. The presence in the ice of seven species with both a caudal appendage and anterior projections suggests a positive relationship between this lorica configuration and the ice habitat. Mechanisms of variance of transverse costal diameters between genera may be useful to the taxonomy and phylogeny of this family. may be useful to the taxonomy and phylogeny of this family. (Auth. mod.)

CR 80-17 SNOW PADS USED FOR PIPELINE CON-STRUCTION IN ALASKA, 1976: CONSTRUC-TION, USE AND BREAKUP.

Johnson, P.R., et al, July 1980, 28p., ADA-090 521, 11

Collina, C.M. 35-2584

35-2584
COLD WEATHER CONSTRUCTION, PIPE-LINES, SNOW ROADS, PERMAFROST PRESER-VATION, SNOW STRENGTH, SOIL TRAFFICA-BILITY, ENVIRONMENTAL PROTECTION, AR-TIFICIAL SNOW.

TIFICIAL SNOW.

Construction pads made of snow were used to build two sections of the Trans Alaska Pipeline and a small gas pipeline during the winter of 1975-76. Construction during the winter of 1975-76. Construction during the winter has become increasingly common in the Arctic. Surface travel and the use of heavy construction equipment on the unprotected tundra have been severely restricted, even during the winter, so the use of temporary winter roads and construction pads built of snow and ice has been advocated and is being adopted. The three snow construction pads mentioned above were the first snow roads and construction pads have two objectives: to protect the underlying vegetation and upper layers of the ground, and to provide a hard, smooth surface for travel and the operation of equipment. Several types have been built, and a brief discussion is given of their history and classification of the Trans Alaska Pipeline and the small gas pipeline in 1975-76 were visited and observed while in use.

HEAT AND MASS TRANSFER FROM FREELY FALLING DROPS AT LOW TEMPERATURES. Zarling, J.P., Aug. 1980, 14p., ADA-090 522, 18 refs. 35-594

DROPS (LIQUIDS), FREEZING, HEAT TRANSFER, MASS TRANSFER, LOW TEMPERATURE TESTS, SUPERCOOLING, ICE PHYSICS, COM-APPLICATIONS, CONSTRUCTION MATERIALS.

MATERIALS.

The use of ice as structural material is common practice for certain applications in cold regions. Techniques such as surface flooding or water spraying are used to accelerate ice growth rates, thereby lengthening the winter construction season. This report examines the heat and mass transfer rates from freely falling water drops in cold air. Design equations which predict the amount of supercooling of the drops as a function of outdoor ambient temperature, drop size and distance of fall are given.

ENVIRONMENTAL ENGINEERING AND ECO-LOGICAL BASELINE INVESTIGATIONS ALONG THE YUKON RIVER-PRUDHOE BAY HAUL ROAD.

Brown, J., ed, Sep. 1980, 187p., ADA-094 497, Refs. p.151-155. For individual chapters see 35-1769 through 35-1772.

Berg, R.L., ed. 35-1768

33-1765
ROADS, CONSTRUCTION, PERMAFROST, SEA-SONAL FREEZE THAW, REVEGETATION, PIPELINES, SOIL EROSION, ENVIRONMEN-TAL IMPACT, ENGINEERING, ECOLOGY.

TAL IMPACT, ENGINEBRING, ECOLOGY.

During the period 1975-1978 the Federal Highway Administration aponsored a series of environmental engineering investigations along the Yukon River to Prudhoe Bay Haul Road.
In 1976 the Department of Benergy joined these investigations
with a series of ecological projects which continue to the
prosent. Both agencies' research efforts were conducted
on a cooperative basis with CRREL's in-house research program. The objectives of the research focused on 1) an

evaluation of the performance of the road, 2) an assessment of changes in the servironment associated with the road, 3) documentation of flore and vegetation along the 577-km-long transact, 4) methodologies for revegetation and restoration, and 5) an assessment of biological parameters as indicators of servironmental integrity. In support of these objectives, specific studies were undertaken that investigated the climate along the road, thaw and subsidence beneath and adjacent to the road, drainage and side slope performance, distribution and properties of road dust, vegetation distribution, vegetation distribution and restoration, and construction of the fuel gas line. This report presents background information on the region, detailed results of the road thaw subsidence and dust investigations, and summaries of revegetation, fuel gas line, vegetation distribution, soil, and weed studies.

INVESTIGATIONS OF SEA ICE ANISOTROPY. ELECTROMAGNETIC PROPERTIES, STRENGTH, AND UNDER-ICE CURRENT ORIENTATION. Kovacs, A., et al, Sep. 1980, 18p., ADA-092 089, 16

reft.

Morey, R.M. 35-1891 SEA ICE, ANISOTROPY, ICE STRENGTH, ELEC-TROMAGNETIC PROPERTIES, ICE CRYSTAL STRUCTURE, BRINES, OCEAN CURRENTS, RADIO ECHO SOUNDINGS.

RADIO BCHO SOUNDINGS.
Results of impulse radar studies of sea ice give support to the concept of a sea ice model in which the ice bottom is composed of an array of lossy parallel plate waveguides. The fundamental relation between the average bulk brine volume of sea ice and its electrical and strength properties is discussed as is the remote detection of under-ice current alignment. It was found that 1) the average effective bulk dielectric constant is dependent upon the average bulk brine volume of the sea ice; 2) sea ice anisotropy, arising from a bottom structure of crystal platelets with a preferred caxis horizontal alignment, can be detected by radio echo counding measurements made not only on the ice surface but also from an airborne platform; 3) the effective coefficient of reflection from the sea ice bottom decreases with increasing bulk brine volume, and is typically one to two orders of magnitude lower than the coefficient of reflection from the ice surface; and 4) the loases in sea ice increase with increasing average bulk brine volume.

MECHANICS OF CUTTING AND BORING. PART 5: DYNAMICS AND ENERGETICS OF INDENTATION TOOLS.

Mellor, M., Sep. 1980, 82p., ADA-092 365, 40 refs.

DRILLING, ICE CUTTING, EXCAVATION, PER-MAFROST, ROCK DRILLING, LOADS (FORCES), EQUIPMENT, DYNAMIC LOADS, STRESSES, DESIGN.

STRESSES, DESIGN.

This report deals with the cutting of rock and other brittle materials by means of indentation tools. The principles of indentation cutters are dealt with at length, the coverage including elastic contact stresses for initial locating by various types of indenters, application of formal plasticity theory penetration analyses, and a variety of theories and penetration analyses that are not based on plasticity theory. Practical indentation mechanisms are described, and theoretical analyses are given for the dynamics and energetics of various types of roller cutters.

The final section reviews experimental investigations and results for rock-cutting discs, giving a systematic summary of available data.

CR 80-22 NEUMANN SOLUTION APPLIED TO SOIL SYSTEMS.

Lunardini, V.J., Oct. 1980, 7p., ADA-092 244, 12 refs.

Solic Freezing, Ground Thawing, Freeze Thaw Tests, Thermal Conductivity, Thermal Diffusion, Active Layer, Phase Transformations, Time Factor, Analysis (Mathematics).

TOR, ANALYSIS (MATHEMATICS).

The only complete, analytic solution for conduction problems with phase change is the Neumann solution. The Neumann solution is valid for phase change in a semi-infinite, homogeneous medium with a step change in aurhoc temperature, starting from an initial temperature which can be different than or equal to the fusion temperature of the medium. The Neumann solution, when applied to soils, forms the basis of a number of formulae for calculating the depths of freezing or thawing. Widely used graphs were previously developed that are valid only when the ratios of the thermal officiality idea of the frozen and thawed soil are unity. In this report general charts, applicable to any property ratios, are developed. The figures have been drawn specifically for soil systems, but they are applicable to any material with appropriate property ratios.

CR 80-23 MODELING OF ANISOTROPIC ELECTRO-MAGNETIC REFLECTION FROM SEA ICE. Golden, K.M., et al, Oct. 1980, 15p., ADA-094 620, 21 refs

Ackley, S.F. 35-1722

35-1722
ANISOTROPY, SEA ICE, ELECTROMAGNETIC
PROPERTIES, BRINES, DIELECTRIC PROPERTIES, MATHEMATICAL MODELS, ICE CRYSTAL STRUCTURE, REFLECTIVITY, RADAR RCHORS

BCHOES.

The contribution of brine layers to observed reflective anisotropy of sea ice at 100 MHz is quantitatively assessed. The sea ice is considered to be a stratified, inhomogeneous, anisotropic dielectric consisting of pure ice containing ordered arrays of conducting inclusions (brine layers). Below the transition zone, the ice is assumed to have constant azimuthal eaxis orientation within the horizontal plane, so that the orientation of brine layers is uniform. The brine layers are also assumed to become increasingly well-defined with depth, since adjacent brine inclusions tend to fuse together with increasing temperature. A theoretical explanation for observed reflective anisotropy is proposed in terms of anisotropic electric flux penetration into the brine layers. Penetration anisotropy and brine layers constant, see the constant of sea ice. In order to illustrate the above effects we present a numerical method of approximating the reflected power of a plane wave pulse incident on a slab of sea ice. Mixture dielectric constant, calculated for two polarizations of the incident wave, are used to calculate power reflection coefficients for the two polarizations.

CR 80-24

MEASUREMENT OF THE SHEAR STRESS ON THE UNDERSIDE OF SIMULATED ICE COV-ERS.

Calkins, D.J., et al, Oct. 1980, 11p., ADA-094 621, 15 refe

Müller, A.

35-1723 ICE MECHANICS, SHEAR STRESS, HYDRAU-LICS, SUBGLACIAL OBSERVATIONS, SUR-FACE ROUGHNESS, WATER, VELOCITY, EX-PERIMENTATION, MODELS.

PERIMENTATION, MODELS.

The fluid shear stress applied to the underside of a simulated floating ice cover was measured in a laboratory flume. The measured values were compared with values of the ahear stress computed from the von Karman-Frandtl velocity distribution fitted to the velocity profiles measured beneath the cover. For the lower velocity runs (about 0.079 m/s) the measured and computed values of the ahear stress were in close agreement. At the high velocity flows (about 0.138 m/s) the measured values were roughly one-half those calculated from the velocity distribution. As the underside of the cover became increasingly rougher, the position of maximum velocity moved closer to the bottom of the channel. It was shown that the Darry friction coefficient is exponentially related to a normalized ice cover thickness, which suggests that it is measure of the roughness of a fragmented ice cover.

CR 80-25

SINGLE AND DOUBLE REACTION BEAM LOAD CELLS FOR MEASURING ICE FORCES. Johnson, P.R., et al, Oct. 1980, 17p., 15 refs.

Zarling, J.P.
35-1724
ICE LOADS, RIVER ICE, BRIDGES, MEASUR-ING INSTRUMENTS, LOADS (FORCES).

ING INSTRUMENTS, LOADS (FORCES).

Two new types of load cells for attachment to bridge piers and direct measurement of ice forces were developed and tested with one type being installed on a pier of the Yukon River Bridge northwest of Pairbank, Alsaka. Both types of load cells used beams supported by base plates and carried nose plates that were loaded by the ice. The loads were imposed at the beams at locations differing from the support reactions so that the loads developed moments in the beams. By instrumenting them with strain gauges, the loads could be measured. Detrils of the design of the load cells, the measured of calculating the loads and experience obtained with load cells are discussed.

BLOCK MOTION FROM DETONATIONS OF BURIED NEAR-SURFACE EXPLOSIVE AR-

Blouin, S.E., Dec. 1980, 62p., ADA-095 492, 31 refs. 35-1999

ROCK MECHANICS, EXPLOSION EFFECTS, EXPLOSIVES, SUBSURFACE STRUCTURES, SOIL MECHANICS.

SOIL MECHANICS.

A vital concern to the survivability of hardened underground structures in rock is the relative displacement induced along geologic discontinuities by nearby explosions. Such displacement, commonly termed block motion, can occur along faults, joints, bedding planes and other structural weaknesses in rock. This report documents all occurrences of block motion observed during the development of DIHEST, a series of shallow-buried high explosive experiments designed to simulate the direct induced ground motions from a nuclear surface burst. Instances of block motion are described,

along with pertinent details of the explosive arrays, geology and ground motion fields. The influence of these and other factors on the direction and magnitude of block motion is discussed.

PHASE CHANGE AROUND A CIRCULAR PIPE Lunardini, V.J., Dec. 1980, 18p., ADA-094 600, 12

ron.
35-1894
PIPES (TUBES), HEAT TRANSFER, PERMA-FROST THERMAL PROPERTIES, STEFAN PROBLEM, PHASE TRANSFORMATIONS, FROZEN GROUND STRENGTH, THERMAL DIFFUSION, FREEZE THAW CYCLES, ANAL-YSIS (MATHEMATICS).

YSIS (MATHEMATICS).

No general, analytical solution exists for phase change around a cylinder, thus, approximate methods have been evaluated. The heat balance integral technique applied to the cylinder gave excellent results when compared to published numerical solutions. Graphical solutions are given for phase change about a cylinder for ranges of the Stefan number, superheat parameter, and property value ratios for typical soils. An approximate, general solution has been derived which is ressonably accurate and can be used for any values of the above-mentioned parameters. The effective thermal difficulties that have shown to be useful for practical above-mentioned parameters. The effective thermal fusivity method has been shown to be useful for prac-problems of phase change.

CR 80-28 CLEARING ICE-CLOGGED SHIPPING CHAN-NELS.

Vance, G.P., Dec. 1980, 13p., ADA-095 490, 18 refs. 35,2000

CHANNELS (WATERWAYS), ICE REMOVAL, ICE NAVIGATION, ICE CONDITIONS, RIVER ICE, STREAM FLOW, WATER LEVEL.

ICE, STREAM FLOW, WATER LEVEL.

This report investigates the feasibility of clearing ice from
the shipping channel of the St. Marys River. Four basic
concepts are investigated: disposal under the ice, disposal
on top of the ice, sturying and rathing. Each technique
was found to have application in limited portions of the
river with the exception of disposal on top of the adjacent
ice sheet, which is deemed feasible throughout the river
system. Disposal onto the adjacent ice sheet will increase
the free stream velocity less than 1.0 ft/s (30.5 cm/s) and
raise the water level less than 1.0 ft (0.30 m). Further
model and field tests are recommended to validate the findings
of this report. of this report.

CR 80-29

FATE AND EFFECTS OF CRUDE OIL SPILLED ON SUBARCTIC PERMAPROST TERRAIN IN INTERIOR ALASKA.

Johnson, L.A., et al, Dec. 1980, 67p., ADA-095 491, Refs. p.41-43.

Sparrow, E.B., Jenkins, T.F., Collins, C.M., Davenport, C.V., McFadden, T. 35-2001

OIL SPILLS, PERMAFROST, VEGETATION, DAMAGE, SOIL MICROBIOLOGY, THAW DEPTH, SLOPES, FREEZE THAW CYCLES.

DAMAGE, SOIL MICROBIOLOGY, THAW DEPTH, SLOPES, FREEZE THAW CYCLES. This study was conducted to determine the short- and long-term physical, chemical and biological effects of spills of not Prudhoe Bay crude oil on permaftrest terrain near Pairbanks, Alaska. Two experimental oil spills, one in winter and one in summer, of 7570 liters (2000 gallons) were made at a forest site. The winter-spill oil moved within the surface moss layer beneath the snow. The summer-spill oil moved primarily below the moss in the organic soil. The oil moved faster and further downslope in the summer spill. Oil in the winter spill stopped during the first day but remobilized and flowed further downslope in the spring. The total area affected by the summer spill spill. The initial heat of the spilled oil had little measurable thermal effect on the soil. However, thaw depth significantly increased following two full thaw seasons. The greatest increases occurred beneath oil black-ened surfaces. Exporation of volstile components is the most significant weathering process in the first two years. Volatiles evaporated faster from surface oil than from oil carried deeper into the soil profile. Microbial degradation has not been observed. The indigenous soil microbial populations responded differently to winter and summer oil applications, ranging from inhibition to stimulation, with stimulation appearing to predominate. Vegetation showed both immediate and long-term damage. Denage was greatest near the top of the slope and in areas with surface oil. CTP 86.36

FIELD COOLING RATES OF ASPHALT CON-CRETE OVERLAYS AT LOW TEMPERATURES. saton, R.A., et al, Dec. 1980, 11p., ADA-095 489, 7 nefs.

Berg, R.L. 35-2002

TEMPERATURE EFFECTS, BITUMINOUS CON-CRETES, COOLING RATE, LOW TEMPERA-TURE TESTS, ROADS, PAVEMENTS, COMPAC-TION.

Six overlay test sections were placed on an existing to road in Hanover, New Hampshire, to gain experience

compaction of asphalt pavements at rolling temperatures as low as 150 F. The asphalt cement and aggregate used had mix characteristics similar to those of the mix expected to be used for a proposed overlay project at Thule Air Bass, Greenland. Results of the overlay tests showed that computer-modeled cooling curves can be accurate predictors of the actual asphalt overlay cooling with time. In Addition, the effects of temperature upon compaction were determined and it was found that nuclear gauges, when used and calibrated properly, successfully monitored mix density changes during compaction.

ICING ON STRUCTURES.

Minsk, L.D., Dec. 1980, 18p., ADA-095 474, 34 refs.

STRUCTURES, ICING, ICE ACCRETION, ICE LOADS, ICE PREVENTION, HUMIDITY, WIND PRESSURE, ICE COVER THICKNESS.

PRESSURE, ICE COVER THICKNESS.

Ice accretion on structures built on the earth's surface is discussed. Sources of water are the atmosphere or water bodies near or surrounding the structure. Ice types include frost, rime, giaze and spray; properties and conditions governing their formation are presented. Methods of estimating accretion rates and total accretion on structures are given, and canadian codes for ice and wind loads on structures are included. Techniques for preventing ice accretion or removing accreted ice are presented.

CR 81-01 ANALYSIS OF ICE JAMS AND THEIR METEOROLOGICAL INDICATORS FOR THREE WINTERS ON THE OTTAUQUECHEE RIVER, VERMONT.

Bates, R.B., et al, Feb. 1981, 27p., ADA-099 173, 11 refa.

35-3926

ICE JAMS, ICE BREAKUP, ICE FORMATION, RIVER ICE, METEOROLOGICAL DATA.

RIVER ICE, METEOROLOGICAL DATA.

The formation of ice jams and their meteorological indicators were studied in detail for the winters of 1975-76, 1976-77 and 1977-78 on the Ottauquechee River at and east of Woodstock, Vermont. Meteorological data are presented for nearby National Weather Service Co-Operative Stations as well as for CRREL sites on the Ottauquechee River. The severity of each winter is discussed, as are the effects of a heavy rainfall on a high water-equivalent snow cover. The resultant runoff and subsequent ice jamming that occurs is discussed. Continuous monitoring of water temperature before, during and immediately after an ice cover formed on the river during the winter of 1977-78 is included. The report includes a section on warm sewer outfall effects on on one river ouring the winter of 1977-78 is included. The report includes a section on warm sewer outfall effects on the ice at and below a municipal treatment plant. Retrieved data will assist in future modeling studies to help predict ice formation, growth, decay and jamming of river ice covers.

CR 81-02 HYPERBOLIC REFLECTIONS ON BEAUFORT SEA SEISMIC RECORDS. Neave, K.G., et al, Mar. 1981, 16p., ADA-099 172, 8

Selimann, P.V., Delaney, A.J.

36-318

BOTTOM SEDIMENT, SEISMIC REFLECTION, OCEAN BOTTOM, ICE CONDITIONS, SEA ICE, BEAUFORT SEA.

Many hyperbolic reflect ons have been observed on marine Many hyperbolic reflections have been observed on marine seismic records obtained during oil exploration in the Beaufort Sea, and on USGS seismic sub-bottom profiles from the Prudhoe Bay vicinity. A hyperbolic projection system was designed to rapidly measure seismic velocities from the curves on the records. The velocities observed were approximately the velocity of sound in water. The hyperbolic signals also showed dispersion properties similar to acoustic normal modes in shallow water. These observations indicate that the strength rememble for the hyperbolic signals are similar to acoustic normal modes in shallow water. These observations indicate that the strength rememble for the hyperbolic signals are similar to acoustic normal modes in shallow water. normal modes in shallow water. These observations indicate that the signals responsible for the hyperbolic reflections propagate as normal modes within the layer, with very limited penetration of the seabed. Determinations of the dominant frequency of these signals indicate that the penetration into the seabed has a characteristic attenuation depth (akin depth) of about 1.5 m for the sub-bottom profiles and 12 m for the marine records. It therefore appears that some hyperbolic reflections may be generated by variations in material that occur near the seabed. There is some evidence of linearity of the anomalies, possibly related to sediment-filled or open ice gouges, or other changes in material properties at shallow depths.

HYDRAULIC MODEL STUDY OF A WATER IN-TAKE UNDER FRAZIL ICE CONDITIONS. Tantillo, T.J., Mar. 1981, 11p., ADA-099 171, 8 refs. 36-319

36-319
WATER INTAKES, ICE CONDITIONS, FRAZIL ICE, HYDRAULIC STRUCTURES, ICE PREVENTION, PROTECTION, MODELS, BUOYANCY.
A 1:24 scale hydraulic model study of a water intake under frazil ice conditions is presented. The intake, located 9 m below the surface of the St. Lawrence River in Massena, New York, has a throughflow of 0.14 cu m/s. The model study, conducted in the refrigerated flume facility of the U.S. Army Cold Regions Research and Engineering Laboratory, investigated methods of minimizing the frazil ice blockage on the intake. Two protective structures were modeled

and the relative benefits of each are presented. The additional cross-sectional area provided by the protective structures lowered the vertical velocity component of the intake water to 0.0027 m/s. At this velocity the buoyant force acting on the frazil ice particle is larger than the downward drag force, causing the particle particle to rise. The results demonstrate that under certain low flow conditions a protective structure can minimize frazil ice blockage problems.

CR 81-04 MOVEMENT STUDY OF THE TRANS-ALASKA PIPELINE AT SELECTED SITES. Ueda, H.T., et al, Apr. 1981, 32p., ADA-101 605, 3

Garfield, D.B., Haynes, F.D.

PIPELINES, MECHANICAL PROPERTIES, STA-BILITY, PIPELINE SUPPORTS, ANCHORS, UNITED STATES—ALASKA.

UNITED STATES—ALASKA.

Eight sites along the trans-Alaska pipeline from the Denail Fault to Pairbanks were selected for pipeline and pipeline support movement studies. Four measurement surveys were conducted, starting before all pumping operations began up to September 2, 1978, to determine the lateral and longitudinal pipe movement due to the thermal expansion of elevated actions of the pipeline, the tilt of the vertical support members (VSM's), and the changes in relative elevation of the support crossbeams. A maximum lateral and longitudinal motion of the pipe of 13 3/4 in and 2 3/16 in respectively were measured up to September 1978. Tilt data for 180 VSM's showed little change over a one-year period, with only 5 VSM's tilting more than 0.5 deg. Relative elevation measured over a one-year period. Comparisons of our data with a-built elevations at 8 sites shows a few large differences that cannot be readily explained. In general the pipeline and its supports, at least at the sites studied, show minimal movement and activity. that cannon and its supports, at least and activity.

CR 81-05 VIBRATIONS CAUSED BY SHIP TRAFFIC ON AN ICE-COVERED WATERWAY. Haynes, F.D., et al, Apr. 1981, 27p., ADA-101 541, 11

Maattanen, M.

36-321 SHIPS, VIBRATION, ICE BREAKING, ICE COV-ER, FROZEN GROUND, SEISMOLOGY.

SRILTS, VIBRATION, ICE BREAKING, ICE COVER, FROZEN GROUND, SEISMOLOGY.

Vibrations have been felt on shore along the St. Marys
River in Michigan during the passage of ships through ice.

vibration measurements were made on a ship, on the ice,
on the shore, and on buildings along the shore. Vibration
levels in 1979 were shout an order of magnitude lower
than levels that would cause damage to building walls. Two
factors, however, could have reduced the vibration levels
in 1979: a lack of ice jams and a record high snow cover
which prevented the soil from freezing. Vibration levels
with an ice cover are about four times those without an
ice cover. Icebreaking and opening the channel can reduce
vibration levels by about 50% for a ship following closely
behind another ship. The dominant frequencies measured
on shore were associated with propeller excitation. The
dominant frequencies and magnitude higher than those
on the shore and are related to icebreaking by the bow.
Vibration magnitudes are dependent upon the velocity of
the ship, the energy expended by the ship, the cross-sectional
area of the ship, weather, conditions of the ice and soil,
and site-specific conditions. Further studies are needed
to determine the effects of these factors and to determine
the mode of energy transmission.

CR 81-06

INVESTIGATION OF THE ACOUSTIC EMIS-SION AND DEFORMATION RESPONSE OF FI-

Xirouchakis, P.C., et al, Apr. 1981, 19p., ADA-103 731 .

Chaplin, M., St. Lawrence, W.F. 36-389

ICE ACOUSTICS, FRACTURING, ICE LOADS, PLATES, ICE DEFORMATION, ICE CRACKS, ANALYSIS (MATHEMATICS).

ANALYSIS (MATHEMATICS).

A procedure is described for monitoring the microfracturing activity in ice plates subjected to constant loads. Sample time records of freshwater ice plate deflections as well as corresponding total acoustic emission activities are presented. The linear elastic, as well as viscoelastic, response for a simply supported rectangular ice plate is given. Suggested future work using te above procedure is discussed.

HYDRAULIC CHARACTERISTICS OF THE DEER CREEK LAKE LAND TREATMENT SITE DURING WASTEWATER APPLICATION. Abele, G., et al, Apr. 1981, 37p., 3 refs. McKim, H.L., Caswell, D.M., Brockett, B.E.

36-390

SOIL WATER, WASTE DISPOSAL, WATER TREATMENT, HYDRAULICS, DRAINAGE, IR-RIGATION, SEEPAGE, LAND RECLAMATION. During the summer of 1979, wastewater was applied 10 times to the Deer Creek Lake, Ohio land treatment site. Wastewater distribution on the ground during spray application is not uniform: some locations receive less than 70% and

others more than 130% of the mean amount applied. The saturated infiltration rate ranges from moderately slow (0.6 cm/hr after 1 hr) to slow (0.3 cm/hr after 12 hours). The under-drain flow rate increases approximately as the cube of time until 1 hour after the end of application and then decreases as the reciprocal of time squared. The rate and amount of drainage increases with an increase in the initial soil water content and can be predicted from soil tension measurements. It was possible to calculate the mass water budget at the end of a typical application to within \$8% of the actual water applied.

CD 21.02 SEASONAL GROWTH AND UPTAKE OF NU-TRIENTS BY ORCHARDGRASS IRRIGATED WITH WASTEWATER.

Palazzo, A.J., et al, May 1981, 19p., ADA-101 613, 33

refs. Graham, J.M.

GRASSES, NUTRIENT CYCLE, GROWTH, WASTE DISPOSAL, WATER TREATMENT, IRRIGATION, LAND RECLAMATION, SEASON-GRASSES. AL VARIATIONS.

AL VARIATIONS.

A 2-year field study determined the seasonal growth and nutrient accumulation of a forage grass receiving 7.5 cm/wk of primary treated domestic wastewater. The average N and P concentrations in the wastewater were 31.5 and 6.1 mg/l respectively. An established sward of Penniste orchardgrass (Dactytis glomerata L.) was managed on an annual three cutting system. Grass samples were periodically taken to determine plant dry matter accumulation and uptake of N, P and K. Changes in nutrient uptake within a harvest neriod were related to both changes in dry matter taken to determine plant dry matter accumulation and uptake of N, P and K. Changes in nutrient uptake within a harvest period were related to both changes in dry matter accumulation and plant nutrient concentration. For marinum yields and nutrient removal, it is recommended that orchardgrass be initially harvested at the early heading stage of growth in the spring. Subsequent harvests abould be performed at 5- to 6-week intervals. Average daily dry matter, N and P accumulation was greatest during the first harvest period (May in Hanover, N.H.). This would be the most appropriate time to increase the application rate, thus treating excess wasterwater stored during the writer. use most appropriate time to increase the application rate, thus treating excess wastewater stored during the winter. Estimates of monthly plant removal for N and P are presented as a guide in designing land treatment systems according to the procedures given in the EPA/Corps Land Treatment Design Manual.

CR 81-09 ON THE BUCKLING FORCE OF FLOATING ICE PLATES.

Kerr, A.D., June 1981, 7p., ADA-103 733, 12 refs. 36-392

ICE LOADS, PLATES, FLOATING ICE, ICE COVER STRENGTH, DYNAMIC LOADS, COVER STRENGTH, DY MATHEMATICAL MODELS.

MATHEMATICAL MODELS.
The calculation of the largest horizontal force a relatively thin floating ice plate may eart on a structure requires the knowledge of the buckling load for this floating plate. In the published literature on the stability of continuously supported beams and plates, it is usually assumed that this buckling force corresponds to the lowest bifurcation force p(cr). However, recent studies indicate that, generally, this is not the case, and this report clarifies the situation for floating ice plates. This problem is first studied on a simple model that exhibits the buckling mechanism of a floating ice plate but is amenable to an exact nonlinear analysis. This study shows that, depending on the ratio of the rigidities of the "liquid" and "plate", the post-buckling branch may rise or drop away from the bifurcation point. CR 81-10

CR 81-10 REVIEW OF THERMAL PROPERTIES OF SNOW, ICE AND SEA ICE. Yen, Y.-C., June 1981, 27p., ADA-103 734, Refs.

p.25-27. 36-393

ICE THERMAL PROPERTIES, SEA ICE, SNOW DENSITY, SNOW THERMAL PROPERTIES, ICE DENSITY, THERMAL PROPERTIES, COMPRESSIVE PROPERTIES, TERMAL EXPANSION.

SIVE PROPERTIES, TERMAL EXPANSION.
This treatise thoroughly reviews the subjects of density, thermal expansion and compressibility of ice; snow density change attributed to destructive, constructive and melt metamorphism; and the physics of regelation and the effects on penetration rate of both the thermal properties of the wire and stress level. Heat capacity, latent heat of fusion and thermal conductivity of ice and snow over a wide range of temperatures were analyzed with regression techniques. In the case of snow, the effect of density was also evaluated. The contribution of vapor diffusion to heat transfer through snow under both natural and forced convective conditions was excessed.

Expressions representing specific and latent heat of sea ice in terms of sea ice salinity and temperature. Theoretical models were given that can predict the thermal conductivities of fresh bubbly ice and sea ice in terms of salinity, temperature and fractional air content.

CR \$1-11

CR \$1-11 PREDICTION OF EXPLOSIVELY DRIVEN RELATIVE DISPLACEMENTS IN ROCES.
Blouin, S.E., June 1981, 23p., ADA-101 314, 15 refs.

ROCK MECHANICS, EXPLOSION EFFECTS, NUCLEAR EXPLOSIONS, SOIL MECHANICS, FORECASTING.

Relative displacement data from high explosive, shallow-buried bursts in rock are combined with relative displacement data from the contained nuclear explosion MIGHTY SPIC. Analysis of these data yields a preliminary, semi-empirical technique for predicting the location, direction and magnitude of relative displacements in rock from contained explosions. of relative displacements in rock from contained explosions.

This technique is used to make relative displacement predictions for the DIABLO HAWK nuclear blast.

CR \$1-12

REVEGETATION AND SELECTED TERRAIN DISTURBANCES ALONG THE TRANS-ALASKA PIPELINE, 1975-1978.

Johnson, A.J., June 1981, 115p., ADA-138 426, 41

38-4413

REVEGETATION, SOIL EROSION, GRASSES, PIPELINES, ENVIRONMENTAL POLAR REGIONS.

POLAR REGIONS.

Revegetation techniques along the trans-Alaska pipeline as employed by Alyeska Pipeline Service Company during the 1973-1978 summers were observed. Objectives included determining the success of treatments, identifying problems areas, and noticing long-term implications. Observations and photographs at 60 sites located along the trans-Alaska pipeline indicated frequent occurrence of successful revegetation as well as frequent problems, such as erosion, alope instability, poor scheduling of seed application, occurrence of weed species, failure to optimally reuse topsoil and finegrained soil, and low rates of native species reinvasion. Alyeska's visual impact engineering was observed to be very successful, as shown by high first-season survival. However, a related program for establishing willow cuttings was unsuccessful in 1977 but appeared very promising in 1978 largely due to improved management and more favorable growing conditions. Terrain disturbances due to the construction of the fuel gas line, snowpads, and oil spills were examined to identify and describe related environmental impacts on natural vegetation. Proper construction and use of snowpads minimized the extent and severity of disturbance. Crude oil spills, although damaging to vegetation, did not cause total kill of vegetation, and certain types of spills may have only short-term effects. Results of restoration research by CREEL along the trans-Alaska pipeline are discussed. CR 81-13

VHF ELECTRICAL PROPERTIES OF FROZEN GROUND NEAR POINT BARROW, ALASKA. Arcone, S.A., et al, June 1981, 18p., ADA-103 735, 32

refs. Delaney, A.J.

36-395

PERMAPROST PHYSICS, DIELECTRIC PROP-ERTIES, RADIO WAVES, FROZEN GROUND PHYSICS, SOIL COMPOSITION, WATER CON-TENT, ORGANIC SOILS.

TENT, ORGANIC SOILS.

Electrical properties of frozen ground were measured using radio frequency interferometry (RFI) in the very high frequency (VHF) radiowave band.

Ice-rich organic silts and sands and gravels of variable ice content were investigated during early April of both 1979 and 1980.

Prequencies between 10 and 150 MHz were used with best results obtained between 40 and 100 MHz. Surface impedance and magnetic induction techniques were also used to obtain a separate control on vertical inhomogeneity.

Soil samples were tested for organic and water content.

The dielectric constants and water content.

The dielectric constants are the ice-rich oreanic silts ranged from 4.0 control on vertical inhomogeneity. Soil samples were tested for organic and water content. The dielectric constants determined for the ice-rich organic silts ranged from 4.0 to 5.5 while those for the sands and gravels were about 5.1. Dielectric loss was due to d.c. conduction and was very low for the silts but significant for the sands and gravels were most likely due to the higher concentrations of salt that are reported to exist in the old beach ridges in this region. All the RFI measurements are believed to be indicative of only the first few meters of the ground although the radiowaves could penetrate to tens of meters. CR 81-14

WASTEWATER TREATMENT BY A PROTO-TYPE SLOW RATE LAND TREATMENT SYS-TEM.

Jenkins, T.F., et al, Aug. 1981, 44p., ADA-106 975. Refs. p.37-39.

Palazzo, A.J. 36-1308

WASTE TREATMENT, WATER TREATMENT, CHEMICAL ANALYSIS, NUTRIENT CYCLE, EVAPOTRANSPIRATION, PLANTS (BOTANY), SOIL WATER.

CR 81-15 STATISTICAL EVALUATION OF SOIL AND CLIMATIC PARAMETERS AFFECTING THE CHANGE IN PAVEMENT DEFLECTION DUR-ING THAWING OF SUBGRADES.

Chamberlain, E.J., July 1981, 10p., ADA-106 976, 7

36-975 36-975
PAVEMENTS, DEFORMATION, SEASONAL
PREEZE THAW, SUBGRADE SOILS, LOADS
(FORCES), CLIMATIC FACTORS, FROST PENETRATION, STATISTICAL ANALYSIS.

This report analyzes the results of a field study previousl reported by Scrivner et al (1969) for the National Cooperativ

Highway Research Program. These authors studied the seasonal pavement deflection characteristics of 24 test sites on roads in service in regions with freezing indexes ranging from 100F-days to 2100F-days. They used the Dynasficer cyclic pavement loading device to determine the pavement system response. Of specific interest to the analysis was the increased pavement deflection after freezing and thawing and the time to recovery of normal deflection characteristics. These characteristics were related to soil and climatic factors using statistical techniques. The most significant observations of this statistical analysis are: 1) that the freezing index is not a significant parameter in deflection during thawing, and 2) that the recovery time is inversely proportional to the depth of freezing. As was expected, the most significant variable affecting the increase in pavement deflection was the frost susceptibility classification. This observation reinforces the necessity for careful selection of soil materials used in pavement systems.

CR 81-16

COLD REGIONS TESTING OF AN AIR-TRANS-PORTABLE SHELTER.

Flanders, S.N., Aug. 1981, 20p., ADA-107 131, 9 refs. 36-1309

PORTABLE SHELTERS, TRANSPORTATION, COLD WEATHER PERFORMANCE, AIR-PLANES, TESTS.

PLANES, TESTS.

An air-transportable shelter designed and built at CRREL for use in cold regions underwent testing in Hanover, New Hampshire, and Ft. Greely, Alaska. The shelter demonstrated some of its capabilities for mobility by being towed for more than 60 miles behind various vehicles and by being transported on a C-130 cargo sirplane, a CH-47 helicopter, and a trailer truck. The shelter proved to be very easy for a crew of two to four to set up in all weather conditions including -40F cold. However, the gasoline-powered generator, which was a source for space heat as well as electricity, functioned very poorly. Overall, the prototype successfully demonstrated qualities of self-reliance, ease of operation and thermal efficiency.

CR 81-17

SUBSEA TRENCHING IN THE ARCTIC. Mellor, M., Sep. 1981, 31p., ADA-108 341, 44 refs.

40-4673
DREDGING, OCEAN BOTTOM, PIPE LAYING, ICE SCORING, ICE ACTION, EQUIPMENT, VELOCITY, ICEBERGS, PRESSURE RIDGES, PROTECTION.

PROTECTION.

Environmental conditions are described for the continental shelf of the western Arctic, and for the shelf of Labrador and Newfoundland.

Special emphasis is given to the gouging of bottom sediments by ice pressure ridges and icebergs, and an approach to systematic risk analysis is outlined. Protection of subses pipelines and cables by trenching and direct embedment is discussed, touching on burial depth, degree of protection, and environmental impact. Conventional land techniques can be adapted for trenching across the beach and through the shallows, but in deeper water special equipment is required. The devices discussed include hydraulic dredges, submarine dredges, plows, rippera, water jets, disc saws and wheel ditchers, ladder trenchers and chain saws, routers and slot millers, ladder trenchers and chain saws, routers and slot millers, ladder dredges, vibratory and percussive machines, and blasting systems. Consideration is given to the relative merits of working with seabed vehicles, or alternatively with direct surface support from vessels or from the sea ice.

CR 21-12

CHENA RIVER LAKES PROJECT REVEGETA-TION STUDY-THREE-YEAR SUMMARY. Johnson, L.A., et al, Oct. 1981, 59p., ADA-108 909, 22 refs.

Rindge, S.D., Gaskin, D.A. 36-2222

REVEGETATION, GRASSES, GROWTH, SOIL STABILIZATION, GRAVEL, VEGETATION, UNITED STATES—ALASKA—PAIRBANKS. VEGETATION.

UNITED STATES—ALASKA—FAIRBANKS.
During the growing seasons of 1977, 1978 and 1979, revegetation techniques were studied on the Chena River Lakes Project, a flood control dam and levee near Pairbanks, Alsaka to find an optimal treatment for establishing permanent vegetation cover on the gravel structures. The treatments tested on plots at the dam and/or levee involved three main variables: 1) vegetation (grass and clover seed and/or willow cuttings), 2) mulch, mulch blanket, and/or sludge, and 3) substrate (gravel or fine-grained soil over the gravel base). The mulches were hay, wood-cellulose-fiber, peat mosa, and Conwed Hydro Mulch 2000, which is a wood-cellulosefiber mulch with a polysaccharide tackifier. A constant rate of fertilizer was applied to all plots except the control. A section of each plot was refertilized again in their third growing season to compare annual and biannual fertilization. The high fertilization rate produced above-average growth. Pescue, brome, and foxtall were the most productive species on the dam, while slaike clover was the most productive on the wetter levee site. When grass seed and willow cuttings were planted at the same time, willow survival and growth were reduced. Fertilization is required for at least two years to produce an acceptable permanent vegetation cover, althoush fine-grained and growth were reduced. cuttings were planted at the same time, willow survival and growth were reduced. Pertilization is required for at least two years to produce an acceptable permanent vegetation cover, although fine-grained soil or sludge reduces the amount of fertilizer needed in the second year. Third-year fertilization may be necessary since the benefits of the second fertilization continue for at least two years. A sludge treatment refertilized during its second growing season produces the highest blomass recorded in this study. Sludge

from the Pairbanks treatment plant poses little, if any, danger of contamination from heavy metals or pathogens. Four-year-old seedlings of willow and native woody species growing on the dam do not have deeply penetrating root systems and therefore don't appear to pose an early threat of leakage through the dam.

CR 81-19

GROUND-TRUTH OBSERVATIONS OF ICE-COVERED NORTH SLOPE LAKES IMAGES BY BADAR. Weeks, W.F., et al, Oct. 1981, 17p., ADA-108 342, 5

refs. Gow, A.J., Schertler, R.J.

38-4414

LAKE ICE, ICE COVER THICKNESS, RADAR ECHOES, ICEBOUND LAKES, ICE WATER INTERFACE, SIDE LOOKING RADAR, UNITED STATES—ALASKA—NORTH SLOPE.

STATES—ALASKA—NORTH SLOPE.
Field observations support the interpretation that differences in the strength of radar returns from the ice covers of lakes on the North Slope of Alaska can be used to determine where the lake is frozen comgetely to the bottom. An ice/frozen soil interface is indicated by a weak return and an ice/water interface by a strong return. The immediate value of this result is that SLAR (side-looking airborne radar) imagery can now be used to prepare maps of large areas of the North Slope showing where the lakes are shallowed are not the SLAR flights). The bethymetry of these shallow lakes is largely unknown and is not obvious from their sizes or outlines. Such information could be very useful, for example in finding suitable year-round water supplies.

CR 81-20

SHALLOW SNOW MODEL FOR PREDICTING VEHICLE PERFORMANCE.

Harrison, W.L., Oct. 1981, 21p., ADA-108 343, 63 refs. 39-1261

SNOW ACCUMULATION, MOTOR VEHICLES, COLD WEATHER PERFORMANCE, TRACTION, SNOW COVER EFFECT, ICE COVER EFFECT, SLUSH, SNOW DEPTH, GROUND THAWING, FORECASTING, MODELS.

A historical review of research is presented to establish the state-of-the-art for analyzing the behavior of vehicles in shallow snow. From this review, the most comprehensive and promising model is put together to establish a first-cut performance prediction model for vehicles operating in shallow snow, slush, ice and thawing soils.

CR 81-21

NEAR-INFRARED REPLECTANCE OF SNOW-COVERED SUBSTRATES

O'Brien, H.W., et al, Nov. 1981, 17p., ADA-110 868, 16 refs.

Koh. G 36-2431

SNOW COVER EFFECT, SOLAR RADIATION, REFLECTION, SUBSTRATES, ICE CRYSTAL OP-TICS, RADIOMETRY, METEOROLOGICAL DATA.

DATA.

The reflection of solar radiation by a snow cover in situ and the apparent influence of selected substrates were examined in wavelength bands centered at 0.81, 1.04, 1.10, 1.30, 1.50 and 1.80 micrometers. Substrates included winter wheat, timothy, corn. affalfa, grass, concrete and subsurface layers of "crusty" snow and ice. Reasonable qualitative agreement between measurements and theoretical predictions was demonstrated, with indications of quantitative agreement in the definition of a "semi-infinite depth" of snow cover. It was concluded that ultimate quantitative agreement between theory and measurement will require that an "optically effective grain size" be defined in terms of physically measurable dimensions or meteorologically predictable characteristics of the ice crystals composing the snow pack.

CR 81-22

ICE DISTRIBUTION AND WINTER SURFACE CIRCULATION PATTERNS, KACHEMAK BAY, ALASKA.

Gatto, L.W., Dec. 1981, 43p., ADA-110 806, 20 refs. 36-2432

ICE CONDITIONS, SEA ICE DISTRIBUTION, OCEAN CURRENTS, SUSPENDED SEDI-MENTS, REMOTE SENSING, LANDSAT, UNIT-ED STATES—ALASKA—KACHEMAK BAY.

Development of the hydropower potential of Bradley Lake, Alaska, would nearly double winter freshwater discharge from Alaska, would nearly double winter freshwater discharge from the Bradley River into upper Kachemak Bay, and the Corps of Ragineers is concerned about possible subsequent increased ice formation and related ice-induced problems. The objectives of this investigation were to describe winter surface circulation in the bay and document ice distribution patterns for predicting where additional ice might be transported if if forms. Fifty-one Landsat MSS band 5 and 7 and RBV images with 70% cloud cover or less, taken between 1 November and 30 April each year, were analyzed for the eight winters from 1972 to 1980 with standard photointer-pretation techniques. Results of this analysis showed that glacial sediment discharged into Kachemak Bay acts as a natural tracer in the water. Inner Kachemak Bay circulation in the winter is predominantly counterclockwise, with northeasterly nearshore currents along the south shore and southwesterly nearshore currents along the north shore. Most of the ice in the inner bay forms at its northeast and and is discharged by the Fox, Sheep and Bradley Rivers. Some ice becomes shorefast on the tidal flats at the head of the bay, while some moves southwestward along the north above pushed by winds and currents.

CB \$1.23 EVALUATION OF A COMPARTMENTAL MODEL FOR PREDICTION OF NITRATE LEACHING LOSSES.

Mehran, M., et al, Dec. 1981, 24p., ADA-111 560, 41

Tanji, K.K., Iskandar, I.K.

WASTE TREATMENT, LEACHING, LAND REC-LAMATION, WATER FLOW, SOIL CHEMISTRY, MODELS.

A model is presented that consists of a water flow submodel and a nitrogen flow submodel. Irrigation, precipitation, evapotranspiration, surface return flow, and deep percolation are considered in the water flow submodel. The processes of nitrification, denitrification, mineralization, immobilization, plant uptaks, and nitrogen fination are included in the nitrogen flow submodel. The model has been applied to two sets of experimental data obtained from 1) controlled test cells at U.S. Army Cold Regions Research and Bujineering Laboratory in Hanover, New Hampshire, and 2) field plots of the University of California at Davis. Comparison between the experimental and model results indicates the potential capabilities of compartmental models in predicting nitrogen behavior in soil-water-plant systems under wastewater land treatment operations. This model is applicable to slow rate, rapid infiltration, and overland flow systems. of nitrification, denitrification, mineralization, immobilization

CR 81-24 TRANSIENT ANALYSIS OF HEAT TRANSMIS-SION SYSTEMS.

Phetteplace, G., Dec. 1981, 53p., ADA-112 365, Refs. p.46-47. 36-2753

HEAT LOSS, UNDERGROUND PIPELINES, HEATING, PUMPS, TEMPERATURE EFFECTS, ANALYSIS (MATHEMATICS, COST ANALYSIS,

SOIL TEMPERATURE, COMPUTER GRAMS.

This report develops a method of analysis for heat transmission systems operating under district heating load conditions. The use of thermal energy storage systems is outlined and advantages are given. The method accounts for the effects of heat source and load characteristics. The transmission model itself considers the following technical aspects: 1) Selectional resource loads in sidile success? model itself considers the following technical aspects: 1) frictional pressure losses in piping systems, 2) pump characteristics, 3) pump driver characteristics, and 4) heat losses from the buried piping. The capital costs considered are the piping system and necessary pumps. Operation and maintenance costs include cost of heat loss and cost of pumping energy input. Allowances are also made for system maintenance and repair over the assumed lifetime. The heat transmission problem is formulated in the forms of a two-dimensional population problem. The decision variables are pipe diameter and supply temperature. The problem dimensional process is formusated in the forms of a two-dimensional optimization problem. The decision variables are pipe diameter and supply temperature. The problem is solved by direct search techniques using a Hooke-Jeeves pattern search algorithm. Parametric results are presented along with suggestions for further work.

CR 81-25 APPLICATION OF THE HEAT BALANCE INTE-GRAL TO CONDUCTION PHASE CHANGE PROBLEMS.

Lunardini, V.J., Dec. 1981, 14p., ADA-112 813, 15 refs.

36-2669 THERMAL CONDUCTIVITY, PHASE TRANSFORMATIONS, HEAT TRANSFER, FREEZE THAW CYCLES, FROZEN GROUND PHYSICS, STEFAN PROBLEM, HEAT FLUX, ANALYSIS (MATHEMATICS), COMPUTER APPLICATIONS, CONVECTION.

TIONS, CONVECTION.

The problem of heat conduction with phase change—often called the Stefan problem—includes some of the most intractable mathematical areas of heat transfer. Exact solutions are extremely limited and approximate methods are widely used. This report discusses the collocation method for the heat belance integral approximation. The method is applied to some standard problems of phase change—Neumann's problem—and a new solution is presented for the case of surface convection for a semi-infinite body. Numerical results are given for soil systems and also for materials of interest in latent heat thermal storage.

CR 81-26 MECHANICS OF CUTTING AND BORING. PART 7: DYNAMICS AND ENERGETICS OF AXIAL ROTATION MACHINES.

Melior, M., Dec. 1981, 38p., ADA-113 931, 10 refs. 36-3110

DRILLS, PERMAPROST, ROCK DRILLING, EQUIPMENT, THERMAL EFFECTS, DRILLING FLUIDS, ANALYSIS (MATHEMATICS).

This report deals with force, torque, energy and power in machines such as drills and boring devices, where the cutting head rotates about a central axis while penetrating parallel to that axis. Starting from a consideration of the forces

developed on individual cutting tools, or segments of cutters, the thrust and torque on a complete cutting head is assessed, and simple relationships between thrust and torque are derived. Similarly, the energy and power needed to drive the cutting head are estimated and related to tool characteristics. sign characteristics of existing machines are compiled and analyzed to give indications of thrust, torque, power, effective tool forces, nominal thrust pressure, power density, and specific

CR 81-27 SEDIMENTOLOGICAL CHARACTERISTICS AND CLASSIFICATION OF DEPOSITIONAL PROCESSES AND DEPOSITS IN THE GLACIAL ENVIRONMENT.

Lawson, D.E., Dec. 1981, 16p., ADA-113 261, 33 refs

GLACIAL DEPOSITS, GLACIOLOGY, SEDI-MENTATION, GLACIER OSCILLATION, PERI-GLACIAL PROCESSES, GLACIER FLOW, ENVI-RONMENTS, CLASSIFICATIONS

Existing classifications for deposits in the glacial environment are inadequate and inconsistent. Deposits should be classiare inadequate and inconsistent. Deposits should be classified both descriptively and genetically; adequate descriptive classifications already exist. A major problem for previous genetic classifications has been that glacial deposition and the resulting deposits properties were poorly understood. On the basis of three criteria—sediment source, uniqueness to the glacial environment, and preservation of glacier-derived properties—deposits in the glacial environment result from to the glacial environment, and preservation of glacier-derived properties—deposits in the glacial environment result from either of two groups of processes: primary or secondary. Primary processes release the debris of the glacier directly and form deposits that may bear properties related to the glacier and its mechanics. Their deposits are classified genetically as till and are the only deposits indicative of glaciation. In contrast, secondary processes mobilize, rework, transport and resediment debris and deposits in the glacial environment. They develop new, nonglacial properties in their deposits, while destroying or substantially modifying glacier-derived properties. Interpretation of their properties may provide information on the depositional process and/or the local depositional environment. Secondary deposits are resedimented and therefore not till. They are classified genetically according to the depositional process just as they are in other sedimentary environments. This genetic classification differs from previous classifications in that not all diamictons deposited in the glacial environment are classified as till; it is based strictly on process-related criteria. The origin of properties of glacial deposits in relation to glacier mechanics and environment must be recognized if the mechanisms and depositional processes of former glaciers are to be precisely understood.

ALASKA GOOD FRIDAY EARTHQUAKE OF

w, G.K., Feb. 1982, 26p., ADA-113 800. 36-2838

EARTHQUAKES, FROZEN GROUND STRENGTH, DAMAGE, ICE SHEETS, ROCK MECHANICS, STRUCTURES, WATER WAVES, UNITED STATES—ALASKA—ANCHORAGE.

On 27 March 1964, a major earthquake struck Southern Alaska. The city of Anchorage, which contained a large part of Alaska's population, suffered loss of life and destruction of property. The time of the day, the season, and ground conditions were such that loss of life and property was minimized. The frozen ground and the ice on fresh water bodies responded to the earthquake shocks in a seldom-observable pattern, which was noted and recorded. Changes of sea level and slides into the sea were responsible for waterfront destruction. It is concluded that the main factor that limited structural damage was the frozen state of the ground.

CR 82-02 DEVELOPMENT OF A RATIONAL DESIGN PROCEDURE FOR OVERLAND FLOW SYS-TEMS.

Martel, C.J., et al, Feb. 1982, 29p., ADA-113 762, 22

Jenkins, T.F., Diener, C.J., Butler, P.L.

SEWAGE TREATMENT, WATER TREATMENT, WASTE TREATMENT, FLOODING, DESIGN.

WASIE IREALIMENT, FLOODING, DISIGN.
This report describes the development of a new design procedure for overland flow systems that is based on hydraulic detention time, a familiar concept in wastewater treatment process design. A two-year study was conducted at Hanover, New Hampshire, on a full-scale overland flow site to obtain performance data in relation to detention time. Kinetobtain performance data in relation to detention time. Kineticic relationships were developed for removal of biochemical oxygen demand, total suspended solids, ammonia, and total phosphorus. Also, an empirical relationship was developed to predict hydraulic detention time as a function of application rate, terrace length, and alope. These relationships were validated using published data from other systems. An advantage of the new procedure, which should significantly reduce site preparation costs, is that it allows overland flow systems to be designed for a wide range of site conditions as long as detention time requirements are met. CR 82-03

BREAKUP OF SOLID ICE COVERS DUE TO RAPID WATER LEVEL VARIATIONS. , L., Feb. 1982, 17p., ADA-112 819, 19 refs. 36-2650

30-253U
ICE BREAKUP, ICE COVER THICKNESS, RIVER
ICE, WATER LEVEL, WATER WAVES, FLEXURAL STRENGTH, FREEZEUP, VARIATIONS,
ICE FORMATION, TIME FACTOR, ICEBOUND

RIVERS, ANALYSIS (MATHEMATICS). The conditions that lead to initial breakup of a solid ice cover on a river due to rapid water level variations are analyzed. The analysis is based on the theory of beams on an elastic foundation. First cracking is assumed to occur when the bending moment induced in the ice cover by the wave exceeds the flexural strength of the ice cover.

CR 82-04 SEA ICE DRAG LAWS AND SIMPLE BOUND-ARY LAYER CONCEPTS, INCLUDING AP-PLICATION TO RAPID MELTING. McPhee, M.G., Feb. 1982, 17p., ADA-113 542, 24

refs.

36-2839 SEA ICE, DRIFT, BOUNDARY LAYER, ICE MELTING, STRESSES, TURBULENT FLOW, VELOCITY, VISCOSITY, BUOYANCY, MATH-EMATICAL MODELS.

EMATICAL MODELS.
Several proposed methods for treating the momentum flux between drifting ses ice and the underlying ocean are interpreted in terms of simple planetary-boundary-layer (PBL) turbulence theory. The classical two-layer approach, in which the solution for a thin surface layer is matched to an Ekman solution for the outer layer, is used to derive several forms for the drag law. These forms range from linear (where stress is proportional to relative speed), through quadratic drag on geostrophic wind in the atmosphere. Only formulations which conform with Roseby-similarity scaling are consistent with free-drift data from the 1975 AIDJEX drift station experiment. We show how a two-layer model, in thickness, provides an analytic solution for the steady-state PBL equation quite similar to recent numerical solutions. The theory is extended to include drag reduction due to buoyancy from rapid melting and is shown to agree with atmospheric results for geostrophic drag under analogous conditions of radiational cooling. The theory provides a basis for estimating trajectories and melt rates of floes drifting into water warmer than the ice melting temperature.

CR 82-05 ON THE TEMPERATURE DISTRIBUTION IN AN AIR-VENTILATED SNOW LAYER. Yen, Y.-C., Mar. 1982, 10p., ADA-115 598, 9 refs.

39-1263

39-103 SNOW TEMPERATURE, HEAT TRANSFER, MASS TRANSFER, TEMPERATURE GRADI-BUTION, DIURNAL VARIATIONS, ANALYSIS (MATHEMATICS).

(MATHEMATICS).

The problem of simultaneous heat and mass transfer in a homogeneous snow layer, with one side kept at its initial temperature and the other side with a step temperature increase, was solved for the case of constant through-flow conditions. An experimentally determined effective thermal conductivity function, i.e. Ke=0.0014+0.58 G (where G is dry mass flow rate of air in g/cm2s), was employed in the solution. The computed nondimensional temperature distribution agreed quite well with experimental data taken under pseudo-steady state conditions with the exception of the temperature for the lowest flow rate used in the experiment. The pronounced nonlinearity of the temperature distribution was found to be a strong function of the flow rate. For sinusoidal variation of atmospheric pressure, the responding flow in the snow medium was also found to be sinusoidal. In conjunction with the diurnal temperature change, this variation facilitated the process of repeated sublimation and condensation in alternate directions and thereby produced a surface layer of approximately constant snow density. surface layer of approximately cons

CR 82-06 MEASUREMENT OF GROUND DIELECTRIC PROPERTIES USING WIDE-ANGLE REFLEC-TION AND REFRACTION.

Arcone, S.A., et al, Mar. 1982, 11p., ADA-119 596, 11

Delaney, A.J. 40-4674

SOIL PHYSICS, DIBLECTRIC PROPERTIES, RADAR ECHOES, GEOPHYSICAL SURVEYS, REFRACTION, EQUIPMENT, WAVE PROPA-GATION.

GATION.

The interpretation of continuous radar profiles requires an alternative geophysical means of obtaining ground dielectric information. Ground dielectric properties were measured using wide-angle reflection and refraction (WARR) soundings with a ground-probing radar set that transmits pulses of a few nanoseconds duration. The investigations, carried out over sandy gravel in interior Alaska, provided dielectric data to about a 5-m depth. The WARR soundings were displayed as individual traces allowing interference between sperate events and dispersion to be observed, and the soundings were compared with continuous radar and resistivity profiles conducted concurrently to extract the maximum

amount of dielectric information. The dielectric constants, derived mainly from the direct ground waves propagating along the surface, ranged from 2.9 to 7.4. Dielectric values interpreted for one site predicted the possibility of a refracted event which may have occurred during one of

CR 82-07

CR 3-97
CRARGED DISLOCATION IN ICE. 2. CONTRIBUTION OF DIRLECTRIC RELAXATION.
Inagaki, K., Mar. 1982, 15p., ADA-113 936, 18 refn.,
The results indicate that the charged dislocation process can produce the observed audio frequency dielectric relaxation as well as the distribution of spectra. 36-2840

ICE ELECTRICAL PROPERTIES, ICE RELAXA-TION, DISLOCATIONS (MATERIALS), ICE CRYSTALS, DIELECTRIC PROPERTIES, ELEC-TRIC CHARGE, RELAXATION (MECHANICS), ANALYSIS (MATHEMATICS), SPECTRA.

The contribution of electrically-charged dislocation motic to dielectric relaxation was studied theoretically. Expensentally obtained data on charge density, dislocation densit and segment length and distribution described in Part of this series were used to calculate dielectric relaxation.

CR 82-0

EVALUATION OF METHODS FOR CALCULATING SOIL THERMAL CONDUCTIVITY.

Farouki, O., Mar. 1982, 90p., 24 refs. 37-221

FROZEN GROUND PHYSICS, THERMAL CON-DUCTIVITY, PERMAFROST HEAT TRANSFER, SOIL COMPOSITION, SOIL WATER, COMPUT-ER PROGRAMS, TESTS.

ER PROGRAMS, TESTS.

A detailed analysis of methods for calculating the thermal conductivity of soils is presented, and trends in the predictions of these methods are compared. The influence of changes in the moisture content on the calculated thermal conductivity of a soil is shown, as is the sensitivity of this calculated value to changes in dry density or in the soil solids' thermal conductivity. The methods are evaluated to determine the extent of agreement of their predictions with measured values obtained on soils of known composition and properties. The deviations of the predicted values are determined for soils that are unfrozen or frozen, coarse or fine, unsaturated, saturated or dry. The applicability of each of the methods under various conditions is determined and recommendations are made as to the best method for each condition.

CR 82-09 MODEL STUDY OF PORT HURON ICE CONTROL STRUCTURE; WIND STRESS SIMULA-

Sodhi, D.S., et al, Apr. 1982, 27p., ADA-115 417, 14

Calkins, D.J., Deck, D.S.

36-3111 ICE CONTROL, LAKE ICE, WATER PRESSURE, WIND PRESSURE, WATER FLOW, SHEAR STRESS, ICE NAVIGATION, PORTS, MODELS. STRESS, ICE NAVIGATION, PORTS, MODELS. This study deals with the distribution of forces along the converging boundaries of the Port Huron, Michigan, region where unconsolidated ice in Lake Huron is held against wind and water streases. An experimental basin was built to induce uniform ahear stress on the model ice cover by flowing water beneath the ice. The boundary segments, which held the ice cover in the region, were instrumented to measure force in the normal and tangential directions. The distribution of normal forces along the boundary was compared with a distribution derived by using a theoretical model. An ice control structure (ICS) was installed in the basin and experiments were conducted to measure the forces on the ICS and the ice release through the opening in the ICS during simulated ship passages. The experimental results are presented in a nondimensional form. In addition, the force per unit length on the ICS and the area of ice released through its opening were estimated for the expected wind conditions at the Port Huron site.

LABORATORY MEASUREMENTS OF SOIL ELECTRIC PROPERTIES BETWEEN 0.1 AND 5 GHZ.

Delaney, A.J., et al, Apr. 1982, 12p., ADA-115 126. Arcone, S.A. 40-4675

PERMAPROST PHYSICS, SOIL PHYSICS, DIE-LECTRIC PROPERTIES, BLECTROMAGNETIC PROSPECTING, WAVE PROPAGATION, SOIL WATER, GROUND ICE, SANDS, SEDIMENTS, REFLECTION.

WATER, GROCIAL REPRESENTION.
Dielectric measurements have been performed on silt and sand samples from permatrost areas using time domain reflectmenty. The sample temperatures were varied from +25 C to -25 C, and volumetric water content was varied between over-day and 0.55 g H2O/cc. The data were formencies between 0.1 and 5.0 GHz. The 25 C to -25 C, and volumetric water content was varied between oven-dry and 0.55 g H2O/cc. The data were processed for frequencies between 0.1 and 5.0 GHz. The results show a constant K' and a low K' for frequencies up to 1 GHz. A frequency dependence seen on the data above 2 GHz is probably the result of unfrozen, adsorbed water. At mointure levels near asturation at all temperatures, these soils have excellent propagation characteristics for ground-probing radar operating below 0.3 GHz. Massive

ally detectable in permafrost within a few

CR 82-11 SHORELINE CONDITIONS AND BANK RECESSION ALONG THE U.S. SHORELINES OF THE ST. MARYS, ST. CLAIR, DETROIT AND SHORELINE ST. LAWRENCE RIVERS.

atto, L.W., May 1982, 75p., ADA-116 398, 31 refs.

39-1204
BANES (WATERWAYS), EROSION, SHORE-LINE MODIFICATION, RIVERS, ICE NAVIGA-TION, PHOTOINTERPRETATION, SOIL ERO-SION, SLIDING, CHARTS, AERIAL SURVEYS, SEASONAL VARIATIONS.

SEASONAL VARIATIONS.

The purpose of this investigation was to provide data to be used in evaluating the effects of winter navigation on were to document bank conditions and erosion sites along the rivers, to monitor and compare the amounts of winter and summer bank recession and change, and to estimate the amount of recession that occurred prior to winter navigation. Shoreline conditions and bank recession were documented during field surveys each spring and fall. Benk changes were evaluated by comparison to observations from a previous survey. Aerial photointerpretation was done prior to winter navigation. Three hundred forty-five miles of river shoreline were surveyed. Banks were evaluated of the common types of bank failures were soil falls (sloughing) and block sidding and slumping. The evesion along approximately 15 miles (70%) of the 21.5 miles was occurring along reaches not bordering winter navigation channels.

SENSIBLE AND LATENT HEAT FLUXES AND HUMIDITY PROFILES FOLLOWING A STEP CHANGE IN SURFACE MOISTURE Andreas, E.L., Apr. 1982, 18p., ADA-115 596, 42 refs.

HEAT FLUX, LATENT HEAT, SURFACE PROP-ERTIES, ANALYSIS (MATHEMATICS), HUMID-ITY, BOUNDARY LAYER, FRICTION, WIND FACTORS.

From a high-quality set of velocity, temperature, and humidity profiles collected upwind and downwind of a step change in surface roughness, temperature, and moisture, upwind and downwind values of the heat fluxes and friction velocity are calculated.

NUMERICAL SOLUTIONS FOR A RIGID-ICE MODEL OF SECONDARY FROST HEAVE O'Neill, K., et al, Apr. 1982, 11p., ADA-115 597, For another version see 36-54. 11 refs.

39-1266 39-1266
FROST HEAVE, SOIL FREEZING, ICE MODELS, REGELATION, ICE FORMATION, GROUNDED ICE, HEAT TRANSFER, MASS TRANSFER, THERMODYNAMICS, ANALYSIS (MATH-EMATICS).

In this paper, frost heave is analyzed for the common case in which some ice penetrates the soil. In this situation, heave is due to the accumulation of soil-free ice just within the frozen zone, behind a frozen fringe of finite thickness. Heat and mass transport within and across that fringe are crucial processes in the dynamics of heave. This analysis concentrates on activity within the fringe, also connecting that activity to heat and mass flows in the more frozen and unfrozen zones. Bach component in a set of governing differential equations is developed from rational physics and thermodynamics, using previous experimental work. Is assumed that the soil ice grows through, interconnected interstices; hence it constitutes and can move as a rigid body. When this assumption is translated into mathematical terms, it completes the governing equations. The model resulting from these considerations is a one-dimensional finite element computer program that solves the equations for arbitrary initial and boundary conditions. The model is used to simulate the heave history of a hypothetical soil column frozen unidirectionally and subjected to a surcharge. The results are gratifying in that they predict qualitatively the characteristics of numerous laboratory observations. Some questions about the completeness of the theory remain, and strict verification of the model awaits further experimentation and better parameter identification.

COMPARATIVE ANALYSIS OF THE USSR CONSTRUCTION CODES AND THE US ARMY TECHNICAL MANUAL FOR DESIGN OF FOUNDATIONS ON PERMAPROST. Fish, A.M., May 1982, 20p., ADA-116 234, 27 refs. 39-1267

PERMAPROST BENBATH FROZEN GROUND SETTLING, COLD WEATH-ER CONSTRUCTION, FOUNDATIONS, PILES, DESIGN CRITERIA, BUILDING CODES, FROZ-EN GROUND STRENGTH, SAFETY, USSR

A comparative study was made of design criteria and analytical methods for footings and pile foundations on permafrost

employed in U.S.S.R. Design Code SNiP 11-18-76 (1977) and U.S. Army Cold Regions Research and Engineering Laboratory Special Report 80-34 developed in the early 1970's by the U.S. Army Corps of Engineers and published in 1980. The absence of adequate constitutive equations for frozen soils and of rigorous solutions of the boundary problems has made it preseasors to incorporate (erribicity problems has made it preseasors to incorporate (erribicity). or trozen sous and or rigorous solutions of the boundary problems has made it necessary to incorporate (explicitly or implicitly) various safety factors in the foundation analyses. From the review it is concluded that the principal difference between these practices is in the assessment and application of appropriate values of safety factors, which leads to a substantial discrepancy in the dimensions and cost of footings and pile foundations in permafrost.

RELATIONSHIP BETWEEN THE ICE AND UN-FROZEN WATER PHASES IN FROZEN SOIL AS DETERMINED BY PULSED NUCLEAR MAGNETIC RESONANCE AND PHYSICAL DE-SORPTION DATA.

Tice, A.R., et al, June 1982, 8p., ADA-118 486, 14

Oliphant, J.L., Nakano, Y., Jenkins, T.F.

77-48
FROST HEAVE, GROUND WATER, FROZEN
GROUND, NUCLEAR MAGNETIC RESONANCE, UNFROZEN WATER CONTENT, SOIL TEMPERATURE.

TEMPERATURE.

An experiment is described that demonstrates the balance between the ice and the unfrozen water in a frozen soil as water is removed.

Nuclear magnetic resonance (NMR) is used to monitor the unfrozen water content as the soil is dehydrated by a molecular siver material.

Our results show that the unfrozen water content of a Morin clay soil remains constant until the total water content has been reduced to the point where no ice remains in the system. Once the ice is depleted, the unfrozen water content determined by NMR corresponds to the toal water content of the soil determined by the weight of water removed by the molecular sieve material.

Thus the validity of utilizing NMR in determining unfrozen water contents we temperature NMR in determining unfrozen water contents vs temp

APPLICATION OF A NUMERICAL SEA ICE MODEL TO THE EAST GREENLAND AREA. Tucker, W.B., Aug. 1982, 40p., ADA-120 659, For another version see 36-3254. 37 refs.

39-1268
ICE MODELS, DRIFT, SEA ICE, THERMODYNAMICS, ICE STRENGTH, MATHEMATICAL
MODELS, ICE COVER THICKNESS, ICE
GROWTH, VELOCITY, HEAT FLUX, OCEAN
CURRENTS, WIND FACTORS, GREENLAND.

CURRENTS, WIND FACTORS, GREENLAND.

A dynamic-thermodynamic sea ice model which employs a viscous-plastic constitutive law has been applied to the Bast Greenland area. The model is run on a 40-km spatial scale at 1/4-day time steeps for a 60-day period with forcing data beginning on 1 October 1979. Results tend to verify that the model predicts reasonable thicknesses and velocities within the ice margin. Thermodynamic ice growth produces excessive ice extent, however, probably due to inadequate parameterization of oceanic heat flux. Ice velocities extent the first order are also not well simulated. produces excessive ice extent, however, probably due to inadequate parameterization of oceanic heat flux. Ice velocities near the free ice edge are also not well simulated, and preliminary investigations attribute this to an improper wind field in this area. A simulation which neglects ice strength, effectively damping ice interaction with itself and allowing no resistance to deformation, produces excessive defit toward the coast and results in unrealistic nearshore thicknesses. A dynamics-only simulation produced reasonable results, including a more realistic ice extent, but the need for proper thermodynamics is also apparent. Other simulations verify that ice import from the Arctic Basin, and ice transport due to winds and currents, were also important components in the model studies.

SEISMIC SITE CHARACTERIZATION TECH-NIQUES APPLIED TO THE NATO RSG-11 TEST SITE IN MUNSTER NORD, FEDERAL REPUB-LIC OF GERMANY.

Albert, D.G., July 1982, 33p., ADA-119 390, 15 refs. 39-1269 SBISMIC REFRACTION, GEOLOGIC STRUCTURES, WAVE PROPAGATION, SEISMOLOGY,

VELOCITY.

VELOCITY.
Seismic P and SH wave refraction experiments at the NATO RSG-11 test site in Minnser Nord, Federal Republic of Germany, reveal the presence of a nearly horizontal, three-layer velocity structure. The upper layer, composed of unconsolidated glacial till, is 1 m thick and has P (compressional) and SH (shear-horizontal) wave velocities of 240 and 165 m/s. The second layer, made up of similar, more compacted material, is 9.5 m thick, with a P wave velocity of 470 m/s and an SH wave velocity of 159 m/s. The third layer, interpreted as the groundwater table, is located at a depth of 10.5 m and has a P wave velocity of 1590 m/s. The SH wave velocity of this layer is controlled by the matrix material and is the same as that of the second layer. A single, unreversed observation indicated fourth layer at a depth of about 20 m, but the existence of this layer remains unconfirmed. The observed fundamental mode Love wave dispersion is in agreement with the theoretical dispersion predicted by the refraction velocities. Computed partial derivatives of phase velocity with respect to shear wave

velocity show, for the frequencies observed, that the dispersion confirms the thicknesses and velocities of the two upper layers and is not affected by the deeper structure.

OPTIMIZING DEICING CHEMICAL APPLICA-TION RATES.

dinsk, L.D., Aug. 1982, 55p., ADA-119 681, 8 refs. 39-1270

CHEMICAL ICE PREVENTION, ICE CONTROL, SALTING, ROAD ICING, SNOW REMOVAL, ICE REMOVAL, SAFETY, FRICTION, TRAFFICA-

BILITY.

Snow and ice control on highways has come to rely heavily on the sodium chloride to maintain a trafficable surface for unimpeded movement. Empirical approaches have led to a wide range of application rates, some clearly excessive, but justified on the ground of safety and expediency. The combination of environmental degradation from the huge quantities of salt entering the environment, along with the increased cost of salt itself and the cost of its application have spurred the search for more precise knowledge of the proper amount of salt to apply to a pavement, considering a range of environmental, traffic and chemical parameters Since controlled tests in the field are extremely difficult to make, a circular test track of three test pavements, dense-graded saphaltic concrete (OGA) and portland cement concrete (PCC), was concrete (OGA) and portland cement concrete (PCC), was constructed in a coldroom. Natural snow and ice were applied to the pavements and an instrumented alipping wheel was crete (OGA) and portland cement concrete (PCC), was constructed in a coldroom. Natural snow and ice were applied to the pavements and an instrumented slipping wheel was driven over the surfaces to generate frictional forces. These forces were measured and then used to evaluate the response to salt application with time for three test temperatures. OGA had the lowest friction values at a temperature near the freezing point, but higher initial values or more rapidly increasing values than DGA and PCC following salt application rate of salt on PCC and DGA lies between 100 and 300 lb/lane mile (I.M.) and a bisher rate resulted in slight or no improvemile (LM), and a higher rate resulted in slight or no improve-ment in friction. DGA showed anomalous results: lower friction for 300 lb/LM and higher friction for both 100 and 500 lb/LM.

CR 82-19 WASTEWATER APPLICATIONS IN FOREST ECOSYSTEMS.

McKim, H.L., et al, Aug. 1982, 22p., ADA-119 994, 38 refs.

WASTE DISPOSAL, WASTE TREATMENT, WATER TREATMENT, FOREST ECOSYSTEMS, TREES (PLANTS), GROWTH, LAND RECLAMA TION, REVEGETATION, WATER POLLUTION.

Under proper design and management, a forest ecosystem in the central United States should renovate municipal was-towater as long or longer than conventional agricultural systems, especially when design limitations are hydraulic loading rate, heavy metals, P and N. Forest systems require smaller buffer zones than agricultural systems and lower sprinkler pressures. Immature forests are better wastewater renovators than mature forests.

CR 82-20 DECELERATION OF PROJECTILES IN SNOW. Albert, D.G., et al, Aug. 1982, 29p., ADA-119 676, 11 refa.

Richmond, P.W. 39-1271

SNOW DENSITY, PENETRATION TESTS, PRO-JECTILE PENETRATION, MILITARY SEARCH, VELOCITY, IMPACT STRENGTH.

SEARCH, VELOCITY, IMPACT STRENGTH. Instrumented M374 projectiles were launched into snow, nylon, and Styrofoam targets using a 10.7-m radius centrifuge. For snow of 410-kg/cu m density, the 3.1-kg test projectile experienced decelerations of approximately 220, 400, and 550 m/sq s (at a depth of 0.1 m) for initial impact velocities of 15, 30 and 46 m/s respectively. These values disagree with values predicted from a simple hydrodynamic drag force approximation. The decelerations measured for snow targets were always greater, than those measured for nolon ets were always greater than those measured for nylon ving targets (of density 120 kg/cu m) indicating that material is not a good analog for snow of the density

CR 82-21 ACOUSTIC EMISSIONS FROM POLYCRYS-TALLINE ICE.

St. Lawrence, W.F., et al, Aug. 1982, 15p., ADA-119 632, 18 refs.

Cole, D.M. 37-734

ICE CRYSTAL STRUCTURE, ICE ACOUSTICS, COMPRESSIVE PROPERTIES, STATIC LOADS, FRACTURING, STRESSES, STRAINS, TEMPERATURE EFFECTS, TIME FACTOR, TESTS.

The acoustic emission response from fine-grained polycrystal-line ice subjected to constant compressive loads was examined. A number of tests were conducted with the nominal stress ranging from 0.8 to 3.67 MPs at a temperature of -5 C. The acoustic emission response was recorded and the data are presented with respect to time and strain. The source of acoustic emissions in ice is considered in terms of the formation of both microfractures and visible fractures that develop without catastrophic failure of the ice. A model to describe the acoustic emission response is developed.

CR 82-22

CONDUCTION PHASE CHANGE BENEATH INSULATED HEATED OR COOLED STRUC-TURES

Lunardini, V.J., Aug. 1982, 40p., ADA-119 595, 19

39-1746

PERMAFROST BENEATH STRUCTURES, PER-MAFROST HEAT TRANSFER, FREEZE THAW MAPROSI HEAT IRANSPER, FREEZE THAW
CYCLES, CONDUCTION, HEAT TRANSFER,
PHASE TRANSFORMATIONS, UNDERGROUND PIPELINES, THERMAL INSULATION, ANALYSIS (MATHEMATICS).

TION, ANALYSIS (MATHEMATICS).

The problem of thawing beneath heated structures on permafrost (or cooled structures in non-permafrost zones) musbe addressed if safe engineering designs are to be conceived.
In general there are no exact solutions to the problem of
conduction heat transfer with phase change for practical
geometries. The quasi-steady approximation is used here
to solve the conductive heat transfer problem with phase
change for insulated geometries including infinite strips, rectangular buildings, circular storage tanks, and buried pipes.

Analytical solutions are presented and graphed for a range
of parameters of practical importance.

DIRECT FILTRATION OF STREAMBORNE GLACIAL SILT.

Ross, M.D., et al, Sep. 1982, 17p., ADA-120 751, 8 nefe

Lowman, R.A., Sletten, R.S.

39-1272 SEDIMENTS, GLACIAL DEPOSITS, GLACIAL RIVERS, WATER TREATMENT, GEOLOGICAL SURVEYS, EQUIPMENT.

SURVETS, EQUIPMENT.

A direct filtration, water treatment pilot plant was operated on the Kenai River at Soldotna, Alaska, during the summer of 1980. The purpose of the pilot plant operations was to determine the feasibility of the direct filtration process for removal of glacial silt. The major criterion used to determine feasibility was production of water containing less than 1.0 NTU of turbidity. For the range of raw water turbidities encountered (22-34 NTU), the pilot plant testing indicated that direct filtration was feasible and could be considered as an alternative to conventional water treatment plants containing sedimentation tanks.

SUBSEA PERMAFROST IN HARRISON BAY, ALASKA: AN INTERPRETATION FROM SEIS-MIC DATA.

Neave, K.G., et al, Aug. 1982, 62p., ADA-121 020, 16

Selimann, P.V.

39-1727 39-1727 SUBSEA PERMAFROST, SEISMIC SURVEYS, BOTTOM SEDIMENT, SEISMIC REPRACTION, SEISMOLOGY, NATURAL RESOURCES, OCEAN BOTTOM, UNITED STATES—ALASKA—HARRISON BAY.

Velocity data derived from petroleum industry seismic records from Harrison Bay show that high-velocity material (>2km/s) interpreted to be ice-bonded permafror is common. In the eastern part of the bay, the depth to high velocity material increases and velocity decreases in an orderly manner with increasing distance from shore until the layer is no longer apparent. The western part of the bay is less orderly, possibly reflecting a different geological and thermal history. This western part may be an inundated section of the low coastal plain characterized by the region north of Teshekpuk Lake, and could have contained deep thaw lakes, creating low velocity zones. Along some seismic lines, the high-velocity material extends approximately 25 km offshore. Velocity data derived from petroleum industry sei km offshore

CR 82-25

EXPERIMENTAL INVESTIGATION OF PO-TENTIAL ICING OF THE SPACE SHUTTLE EX-TERNAL TANK.

Ferrick, M.G., et al, Sep. 1982, 305p., ADA-121 330. Itagaki, K., Lemieux, G.E., Minas, S.E.

39-1712
AIRCRAFT ICING, TANKS (CONTAINERS),
SPACECRAFT, PROTECTIVE COATINGS,
THERMAL INSULATION, ICE FORMATION,
COUNTERMEASURES, SURFACE TEMPERA-STATISTICAL ANALYSIS, EXPERIMEN-TATIÓN

TATION.

The thermal protection system tiles on the space shuttle Orbiter are extremely sensitive to impact damage. Such impacts could be caused by ice particles dislodged from the outer surface of the external tank (BT) during the launch. The BT, which contains the cryogenic propellant tanks, is covered with a spray-on foam insulation (SOPT) to minimize for formation. The objective of this investigation we to experimentally explore a range of environmental condition for which significant icing potential exists for the ET. A significant finding, which became evident early in the experimental program, was that computer models based upon the average SOFT thickness predicted panel surface temperatures that were considerably higher than those observed. For an assessment of icing, the important values to characterize

the SOFI are the minimum thickness and range of thickness. Dense ice formation occurred most readily when a small portion of the total surface area had a temperature below freezing.

CR 82-26

HYDROLOGY AND CLIMATOLOGY OF THE CARIBOU-POKER CREEKS RESEARCH WA-TERSHED, ALASKA. Haugen, R.K., et al, Oct. 1982, 34p., ADA-122 402,

Refs. p.25-28. Slaughter, C.W., Howe, K.E., Dingman, S.L.

37-1233

37-1233
WATERSHEDS, DRAINAGE, PERMAFROST
HYDROLOGY, CLIMATE, RUNOFF, STREAM
FLOW, PRECIPITATION (METEOROLOGY),
SEASONAL VARIATIONS, UNITED STATES—
ALASKA—CARIBOU CREEK.

The Caribou-Poker Creeks Research Watershed is a small drainage basin located 48 km northwest of Pairbanks, Alaska. Elevations within the watershed range from 210 to 326 m, and approximately 28% of its area is underlain by permafrost. Climatic differences between the watershed and Fairbanks Climatic differences between the watershed and Fairbanks are primarily due to the higher elevation of watershed. Generally the watershed climatic sities are warmer in winter and cooler in summer than Fairbanks. An analysis of annual streamflow data showed an inconsistency of baseflow recessions from year to year. The runoff-rainfall ratio for individual summer storms averaged 0.35 for Carlbou Creek. Comparisons of apot discharge measurements of predominantly permafrost and non-permafrost subwatersheds showed that permafrost-dominated watersheds have a much "flashier" response to precipitation than non-permafrost watersheds. A com_arison of the annual flow distribution of sheds. A comparison of the annual flow distribution of the watershed indicated that Caribou Creek has lower summer and higher winter discharges per unit area than the Chena or Salcha Rivers. The temporal variability of the flow of Caribou Creek is low compared with small- and moderate-sized streams in New England.

CR 82-27 LEAST LIFE-CYCLE COSTS FOR INSULATION IN ALASKA.

Flanders, S.N., et al, Oct. 1982, 47p., ADA-122 806, 6 refs.

Coutts, H.J. 37-1482

THERMAL INSULATION, BUILDINGS, COST ANALYSIS, ECONOMIC ANALYSIS, CLIMATIC FACTORS, FUELS, MILITARY FACILITIES.

PACIORS, FUBLS, MILITARY FACILITIES.

Recommendations for economical thicknesses for building insulation result from a study of fuel and construction costs of 12 military installations in Alaska. A comparison between the insulation thickness that a building owner might choose today and what he might choose in 20 years indicates a trend for much thicker insulation in the future. An analysis of how much more expensive a building built today with the thickness that would te appropriate 20 years hence indicates only a small penalty in life-cycle costs for the additional insulation. Therefore, a minimum of R-32 walls and R-62 attics is recommended for most of Alaska.

CR 82-28 EVALUATION OF VAISALA'S MICROCORA AUTOMATIC SOUNDING SYSTEM

Andeas, E.L., et al, Oct. 1982, 17p., ADB-070 011L, 17 refs.

Richter, W.A. 37-1529

MARINE METEOROLOGY, METEOROLOGI-CAL INSTRUMENTS, METEOROLOGICAL

MARINE METEOROLOGY, METEOROLOGICAL INSTRUMENTS, METEOROLOGICAL
DATA, WIND (METEOROLOGY).

During the Weddell Polynya Expedition in the southern
ocean, over 60 upper-air soundings were made with a Vaisala
MicroCORA Automatic Sounding System installed on the
Soviet icebreaker Mikhail Somov. The MicroCORA system
measures the wind vector by using the Omega navaid signals
to track the balloon-borne radiosonde. This windfinding
is thus unaffected by any motions of the ground station,
the system is easy to use, and the data seem accurate.
Comparison launches, during which the Vaisala radiosonde
and the sonde of another manufacturer were carried on
the same balloon, indicate that the MicroCORA pressure
and temperature data are also of high quality. There
were problems with the MicroCORA measurement of humdity, however, because of an inordinate number of failures
of the humidity sensor, the Humicap, which is prone to
drift. After a unit-by-unit hardware evaluation of the
components of the MicroCORA a, stem, its expected reliability
for use at sea is judged only fair; several units were poorty
packaged, and servicing and repair require a high degree
of technical expertise. (Auth.)

CR 82-29

CR 82-29 **GROWTH OF FACETED CRYSTALS IN A SNOW** COVER.

Colbeck, S.C., Oct. 1982, 19p., ADA-122 792, 45 refs. 37-1722

SNOW CRYSTAL GROWTH, RECRYSTALLIZA-TION, SNOW CRUST, DEPTH HOAR, HEAT PLUX, VAPOR TRANSFER, GRAIN SIZE, THER-MODYNAMICS, SNOW DENSITY, TEMPERA-TURE EFFECTS, TEMPERATURE GRADIENTS, SNOW COVER.

loe grains in a snow cover with a low temperature gradient sesume a well-rounded equilibrium form. However, at temperature gradients of 0.1 to 0.2C/cm (depending somewhat on temperature and snow density), the rounded grains recrystalize into a faceted kinetic growth form. The large temperature gradient must play a decisive role in moving the vapor fast enough to sustain the rapid growth rate associated with the kinetic growth form. Once the large temperature gradient is removed, the grains recrystallize back to the equilibrium form. The recrystallization occurs in either direction without a change in bulk density. The growth of faceted crystals begins at the warmer base of the snow cover where the excess vapor pressure is largest. A transition between the overlying rounded grains moves upward in time. Faceted crystals also grow just below crusts of reduced permeability, where the increased vapor accumulation can sustain the excess vapor pressure needed for kinetic growth. The heat and vapor flows are described using a model based on thermodynamic equilibrium. The temperature distribution is shown to be quasi-linear at steady state in homogeneous snow. The recrystallization of the snow is modeled using the rounded grains as sources and the faceted grains as sinks. In the future this model should be extended to account for different temperatures among the sources and sinks.

EQUATIONS FOR DETERMINING THE GAS AND BRINE VOLUMES IN SEA ICE SAMPLES. Cox, G.F.N., et al, Oct. 1982, 11p., ADA-122 779, 13 refa

Weeks, W.F.

37-1723
SEA ICE, BRINES, GAS INCLUSIONS, ICE DENSITY, ICE TEMPERATURE, ICE SALINITY,
TEMPERATURE EFFECTS, COMPUTER APPLICATIONS, ANALYSIS (MATHEMATICS).

PLICATIONS, ANALYSIS (MATHEMATICS). Equations are developed that can be used to determine the amount of gas present in sea ice from measurements of the bulk ice density, salinity and temperature in the temperature range of -2 to -30C. Conversely these relationsips can be used to give the density of sea ice as a function of its temperature and salinity, considering both the presence of gas and of solid salts in the ice. Equations are also given that allow the calculation of the gas and brine volumes in the ice at temperatures other than that at which the bulk density was determined.

CR 82-31 BERING STRAIT SEA ICE AND THE FAIRWAY ROCK ICEFOOT.

Kovaca, A., et al, Oct. 1982, 40p., ADA-122 477, 45

Sodhi, D.S., Cox, G.F.N.

39-1273 39-1273
ICE CONDITIONS, SEA ICE, PRESSURE RIDGES, ICE PRESSURE, ICE FORMATION, OFFSHORE LANDFORMS, ICE LOADS, GROUNDED ICE, AERIAL SURVEYS, BERING

Information on sea ice conditions in the Bering Strait and the iceftort formation around Fairway Rock, located in the strait, is presented. Cross-sectional profiles of Fairway Rock and the relief of the iceftot are given along with theoretical analyses of the possible forces active during iceftot formation. It is shown that the ice cover most likely fails in flexure as opposed to cruahing or buckling, as the former requires less force. Field observations reveal that the Fairway Rock iceftot is massive, with ridges up to 15 m high, a seaward face only 20 deg from vertical, and interior ridge slopes averaging 33 deg. The iceftot is believed to be grounded and its width ranges from less than 10 to over 100 m. on ses ice conditions in the Bering Strait and

CR 82-32 FLUID DYNAMIC ANALYSIS OF VOLCANIC TREMOR

Ferrick, M.G., et al, Oct. 1982, 12p., ADA-122 778, 28 refs.

Qamar, A., St. Lawrence, W.F.

37-1400 FLUID DYNAMICS.

SEISMOLOGY. ANOES, EARTHQUAKES, ICEQUAKES, GEO-MAGNETISM

MAGNETISM.

Low-frequency (< 10 Hz) volcanic earthquakes originate at a wide range of depths and occur before, during, and after magmatic eruptions. The characteristics of these earthquakes suggest that they are not typical tectonic events. Physically analogous processes occur in hydraulic fracturing of rock formations, low-frequency lecquakes in temperate glaciers, and autoresonance in hydroelectric power stations. We propose that unsteady fluid flow in volcanic conduits is the common source mechanism of low-frequency volcanic earthquakes (tremor). The fluid dynamic source mechanism explains low-frequency earthquakes of arbitrary duration, magnitude, and depth of origin, as unsteady flow is independent of physical properties of the fluid and conduit. Fluid transients occur in both low-viscosity gases and high-viscosity liquids. A fluid transients can be formulated as generally as is warranted by knowledge of the composition and physical properties of the fluid, material properties, geometry and roughness of the conduit, and boundary conditions.

CR 82-33 ON THE DIFFERENCES IN ABLATION SEA-SONS OF ARCTIC AND ANTARCTIC SEA ICE. Andreaa, E.L., et al, Oct. 1982, 9p., ADA-122 454, 41 refs. For another source see 36-2836 (MP 1517). Ackley, S.F. 39-1728

SEA ICE, ICE MELTING, ABLATION, METEOROLOGICAL FACTORS, ICE CONDI-

TIONS.

Arctic sea ice is freekled with melt ponds during the ablation season; Antarctic sea ice has few, if any. On the basis of a simple surface heat budget, we investigate the metocrological conditions necessary for the onset of surface melting in an attempt to explain these observations. The low relative humidity associated with the relatively dry winds off the continent and an effective radiation parameter smaller than that characteristic of the Arctic are primarily responsible for the absence of melt features in the Antarctic. Together these require a surface-layer air temperature above 0 C before Antarctic sea ice can melt. A ratio of the bulk transfer coefficients C(B)/C(B) less than I also contributes to the dissimilarity in Arctic and Antarctic ablation seasons. The effects of wind speed and of the sea-ice roughness on the absolute values of C(H) and C(B) seem to moderate regional differences, but final assessment of this hypothesis awaits better data, especially from the Antarctic.

HYDRAULIC MODEL STUDY OF PORT HURON ICE CONTROL STRUCTURE. Calkins, D.J., et al, Nov. 1982, 59p., ADA-123 715, 8

refs. Deck, D.S., Sodhi, D.S.

37-2375 ICE CONTROL, HYDRAULIC STRUCTURES, ICE NAVIGATION, ICE MECHANICS, FLOATING ICE, ARTIFICIAL ICE, ICE LOADS, ICE FLOES, DOPED ICE, PORTS, MODELS.

FLOES, DOPED ICE, PORTS, MODELS.

The ice discharge through an opening in an ice control structure was documented to be a function of the floe size, ice type, ice floe conditions and vessel direction. The model data for the average ice discharge per vessel transit scaled to prototype values compared favorably with data taken at the St. Marys River ice control structure (ICS). The model results of the force measurements were also consistent with data taken at the St. Marys ICS. The dynamic loading conditions were independent of vessel direction. The dynamic loading to the structure using 3 types of ice (plastic, natural and urea-doped) showed a considerable tion. The dynamic loading to the structure using 3 types of ice (plastic, natural and uret-doped) showed a considerable difference in their means and standard deviations. The urea-doped ice was evaluated for dynamic loading conditions, and reasonable peak values of 3 to 5 times the mean load at each measuring position were recorded, independent of vessel direction. It appears that synthetic random ice floes may be used in model studies where ice discharge through an opening in a structure needs to be documented. This study shows the synthetic random ice floe discharge to fall reasonably within the values obtained for natural ice discharge for both rafted and non-rafted ice fields above the ICS. However, the question of whether synthetic ice can be used for analyzing force distribution and dynamic force loading criteria cannot be fully answered at this time because the load distributions of the synthetic and natural floes appear to differ.

CR 82-35 CLIMATE OF REMOTE AREAS IN NORTH-CENTRAL ALASKA: 1975-1979 SUMMARY. Haugen, R.K., Nov. 1982, 110p., ADA-123 719, 31

refs. 37-2376

GLIMATE, SNOW ACCUMULATION, PRECIPITATION (METEOROLOGY), AIR TEMPERATURE, TEMPERATURE, TEMPERATURE, TEMPERATURE VARIATIONS, UNITED STATES—ALASKA.

ALASKA.

Air temperature, precipitation, and some ground surface temperatures predominantly from remote areas of central and northern Alaska are statistically and graphically summarized on a monthly basis for a five-year period (1975-79). The remote site data were obtained during the course of several remote site data were obtained during the course of several CRRBL investigations. To provide a more comprehensive coverage, these data are presented together with data obtained at National Weather Service stations in the area. The analysis is based on four climatic regions within the study area: the Continental Interior, the Brooks Range, the Arctic Foothills, and the Arctic Cosstal Plain. A detailed analysis of coastal-inland summer air temperature gradients on the Arctic Cosstal Plain is given. Station histories for the 1975-79 period and tabulated air and ground temperature statistics are included as appendices. statistics are included as appendices

CR 82-36 LONG-TERM MODIFICATIONS OF PERENNI-ALLY PROZEN SEDIMENT AND TERRAIN AT EAST OUMALIK, NORTHERN ALASKA. Lawson, D.E., Nov. 1982, 33p., ADA-123 731, Refs.

p.30-33.

PERMAPROST THERMAL PROPERTIES, DEG-RADATION, SOIL EROSION, SEDIMENTS, TUNDRA, ENVIRONMENTAL IMPACT, THER-MOKARST, ACTIVE LAYER, HUMAN FACTOR ENGINEERING, UNITED STATES—ALASKA—

OUMALIK.

Camp construction and drilling activities in 1950 at the East Oumalik drill site in northern Alaska caused extensive degradation of ice-rich, perennially frozen silt and irreversible modification of the upland terrain. In a study of the long-term degradational effects at this site, the near-surface geology was defined by drilling and coring 76 holes (maximum depth of 34 m) in disturbed areas and by laboratory analyses of these cores.

Terrain disturbances, including bulldozed seology was defined by drilling and coring 76 holes (maximum depth of 34 m) in disturbed areas and by laboratory analyses of these cores. Terrain disturbances, including bulldozed roads and excavations, camp structures and off-road vehicle trails, were found to have severely distrupted the site's thermal regime. This led to a thickening of the active layer, melting of the ground ice, thas unbisdence and thaw consolidation of the sediments. Slumps, sediment gravity flows and collapse of materials on alopes bounding thaw depressions expanded the degradation laterally, with thermal and hydraulic evosion removing material as the depressions widened and deepened with time. Degradational processes became less active after thawed sediments thickened sufficiently to slow the increase in the depth of thaw and permit alope stabilization. The site's terrain is now irregular and hummocky with numerous depressions. Seasonal thaw depths are deeper in disturbed areas than in undisturbed areas and reflect the new moisture conditions and morphology. The severity of disturbance is much greater at East Oumalik than at another old drill site, Fish Creek. The difference results primarily from differences in the physical properties of the sediments, including the quantity and distribution of ground ice. In areas similar to East Oumalik, the removal or severe conscious of the vegetative mat would cause similar adverse physical changes to take place over two to three decades and should therefore be avoided.

MAPPING IN THE ARCTIC NATIONAL WILD-LIPE REFUGE, ALASKA.

Walker, D.A. at al. Marchael

Walker, D.A., et al, Nov. 1982, 59p. + 2 maps, ADA-123 440, Refs. p.34-37. Acevedo, W., Everett, K.R., Gaydos, L., Brown, J.,

39-1274

TUNDRA, MAPPING, REMOTE SENSING, GEOBOTANICAL INTERPRETATION, ENVIRONMENTS, SOILS, PATTERNED GROUND, VEGETATION, CLASSIFICATIONS, LANDSAT, UNITED STATES—ALASKA—ARCTIC NA-TIONAL WILDLIFE REFUGE.

TIONAL WILDLIFE REFUGE.

This report presents a Landsat-derived land cover map of the northwest portion of the Arctic National Wildlife Refuge, Alaska. The report is divided into we parts. The first is devoted to the land cover map we stalled descriptions of the mapping methods and legend. The second part is a description of the study area. The classification system used for the maps is an improvement over existing methods of describing tundra vegetation. It is a comprehensive method of nomenclature that consistently applies the same criteria for all vegetation units. It is applicable for large-and small-scale mapping and is suitable for describing vegetation complexes, which are common in the patterned-ground terrain of the Alaskan Arctic. The system is applicable to Landsat-derived land cover classifications. The describing of the study area focuses on five primary terrain types: flat thaw-lake plains, hilly cosstal plains, foothills, mountainous soils and vegetation are described for each terrain types flat thaw-lake plains, and river flood plains. Topography, landforms, soils and vegetation are described for each terrain types the train types and for the 89 townships within the study areas. Two land cover maps at 1:250,000 are included.

CR 82-38 WINDOW PERFORMANCE IN EXTREME COLD.

Flanders, S.N., et al, Dec. 1982, 21p., ADA-124 571, For another version see 35-2514. 10 refs.

Buska, J., Barrett, S. 38-4415

38-4415
ICING, WINDOWS, WEATHERPROOFING,
MILITARY FACILITIES, THERMAL INSULA-TION, COLD WEATHER CONSTRUCTION, HEAT LOSS, AIR LEAKAGE, HUMIDITY, CON-DENSATION, COUNTERMEASURES, COST ANALYSIS.

Extreme cold causes heavy buildup of frost, ice and condensa-tion on many windows. It also increases the incentive for improving the airtightness of windows against heat loss. Our study shows that tightening specifications for Alaskan windows to permit only 30% of the air leakage allowed by current American airtightness standards is economically

attractive. We also recommend triple glazing in much of Alsaka to avoid window icing in homes and barracka. We base our conclusions on a two-year field study of Alsaka military bases that included recording humidity and temperature data, observing moisture accumulation on windows and measuring sirtightness with a fan pressurization device. CR 82-39

BRINE ZONE IN THE MCMURDO ICE SHELF, ANTARCTICA

Kovaca, A., et al. Dec. 1982, 28p., ADA-124 516, 29

Gow, A.J., Cragin, J.H., Morey, R.M.

GOW, A.J., Cragin, J.H., Morey, R.M.

37-3355

ICE SHELVES, BRINES, ICE SALINITY, ANTARCTICA—MCMURDO ICE SHELF.

A 4.4-m-high brine step in McMurdo Ice Shelf has migrated about 1.2 km in 4 years. This migration is proof of the dynamic nature of the step, which is the leading edge of a brine wave that originated at the shelf edge after a major break-out of the McMurdo Ice Shelf. The inland boundary of brine penetration is characterized by a series of descending steps that are believed to represent terminal positions of separate intrusions of brine of similar origin. The inland boundary of brine percolation is probably controlled largely by the depth at which brine encounters the firn/ice transition (43m). However, this boundary is not fixed by permeability considerations alone, since measurable movement of brine is still occurring at the inland boundary. Freeze-fractionation of the seawater as it migrates through the ice shelf preferentially precipitates virtually all sodium sulfate, and concomitant removal of water by freezing in all pore spaces of the infiltrated firn produces residual brines approximately six times more concentrated than the original seawater. (Auth.) AWRIET. (Auth.)

CR 82-40

BREAKING ICE WITH EXPLOSIVES. Mellor, M., Dec. 1982, 64p., ADA-123 761, 25 refs.

37-2378 37-2378
ICE BREAKING, ICE BLASTING, EXPLOSIVES, EXPLOSION EFFECTS, UNDERWATER EXPLOSIONS, ICE COVER THICKNESS, STATISTICAL ANLYSIS, COMPUTER APPLICATIONS, ANALYSIS (MATHEAMTICS), DESIGN.

YSIS (MATHEAMTICS), DESIGN.

The use of explosives to break floating ice sheets is described, and test data are used to develop curves that predict explosives effects as ice thickness, charge size, and charge depth vary. Application of the curves to practical problems is illustrated by numerical examples. The general features of underwater explosions are reviewed and related to ice blasting. Quasitatic plate theory is considered, and is judged to be inapplicable to explosive cratering of ice plates. The specific energy for optimized ice blasting is found to compare quite favorably with the specific energy of icebreaking ships. All available field data for ice blasting are tabulated in appendices, together with details of the regression analyses from which the design curves are generated. curves are general

CR 82-41 EVALUATION OF PROCEDURES FOR DETER-MINING SELECTED AQUIFER PARAMETERS. Daly, CJ., Dec. 1982, 104p., ADA-125 437, Refs. p.93-104. 37-3496

GROUND WATER, WATER FLOW, HYDROLO-GY, PERMEABILITY, WATER POLLUTION, POROSITY, TESTS.

Many of the important factors influencing the choice appropriate aquifer test procedures are presented. The concepts of bias, accuracy and spatial variability are explained. The definitions of a number of aquifer parameters are developed from basic principles demonstrating the underlying assumptions and limitations. The parameters considered are: piezometric head, hydraulic conductivity/intrinsic permeability, flow directions and the description of the descript head, hydraulic conductivity intrinsic permeability, flow direction, specific discharge magnitude, transmissivity, volumetric flow rate, total porosity, effective porosity, average linear velocity, storage coefficient, specific yield, dispersion coefficient-aquifer dispersivity. For each parameter several techniques are described, evaluated and ranked in terms of perceived potential accuracy, simplicity and value to contaminant transport studies. It must be stressed, however, that the evaluations are based principally upon theoretical grounds, and not upon actual conduct of the desribed procedures.

CR 82-42 EFFECTS OF CONDUCTIVITY OF HIGH-RESO-LUTION IMPULSE RADAR SOUNDING, ROSS ICE SHELF, ANTARCTICA.

Morey, R.M., et al, Dec. 1982, 12p., ADA-124 456, 16 refs.

Kovacs, A. 37-3354

3/-3334 RADAR ECHOES, ELECTRONIC EQUIPMENT, ICE COVER THICKNESS, OCEAN CURRENTS, ANTARCTICA—ROSS ICE SHELF.

ANTARCTICA—ROSS ICE SHELF.
The system was evaluated to detect sea ice on the bottom of the Ross Ice Shelf, detect the preferred horizontal casis azimuthal direction of the sea ice crystals and determine the direction of the currents under an Antarctic ice shelf. Surface radar survey on the Ross Ice Shelf at Site J-9 and surface and airforme radar profiling on the McMurdo Ice Shelf were made. The CRREL impulse radar system was unable to detect the shelf bottom at Site J-9, which drilling revealed to be 416 m below the snow surface. The radar system was used to profile the McMurdo Ice Shelf

both from the snow surface and from the air; a shelf thickness of about 275 m was easily detected. The bulk conductivity of the ice shelf at Site J-9 was higher than originally anticipated, and this limited the radar sounding depth to about 405 m when operating at a frequency of 20 MHz. (Auth. mod.)

CR 82-44

CASE STUDY OF LAND TREATMENT IN A COLD CLIMATE—WEST DOVER, VERMONT. Bouzoun, J.R., et al, Dec. 1982, 96p., ADA-125 438, 42 refs. Collection of two articles. Meals, D.W., Cassell, E.A.

37-3494 37-394
ICE FORMATION, WASTE TREATMENT, WATER TREATMENT, SNOW ACCUMULATION, LAND RECLAMATION, COLD WEATHER PERFORMANCE, GROUND WATER, WATER PIPELINES, HYDROLOGY, NUTRIENT CYCLE, SURFACE WATER.

CYCLE, SURFACE WAIER.

A slow rate land treatment system that operates throughout the year in a very cold climate is described in detail. Information on the geology, soils, vegetation, wildlife and the climate at the site is also presented. Winter operational problems such as ice formation on the elevated spray laterals, and freezing and plugging of the spray nozzles are discussed, as are their solutions. The detailed results of a 1-year study to historicaries the seasonal performance of the system. as are their solutions. The detailed results of a 1-year study to characterize the seasonal performance of the system, to develop N and P budgets for the system, to monitor specific hydrologic events on the spray field, to monitor shallow groundwater quality, to monitor the groundwater quality in off-site wells, and to monitor the water quality of two rivers that border the site are presented. Recommendations for the design and operation of other slow rate land treatment systems to be constructed in cold climates are included.

CR 83-01

ANALYSIS OF ROOF SNOW LOAD CASE STUDIES; UNIFORM LOADS.
O'Rourke, M., et al, Jan. 1983, 29p., ADA-126 330, 12

Koch, P., Redfield, R.

77.3351 ROOPS, BUILDING CODES, SLOPE ORIENTA-TION, DESIGN, STATISTICAL ANALYSIS.

TION, DESIGN, STATISTICAL ANALYSIS.

Roof snow load case studies gathered throughout the United States over a three-year period are analyzed. The objective of the analysis is to determine a relationship between the snow load on the ground and the corresponding uniform snow load on flat and sloped roofs. The main parameters considered are the thermal characterities of the roof, the roof slope and the exposure of the structure. Exposure has the strongest effect on the ratio of ground to roof snow loads. Comparisons are made with existing and proposed building codes and standards.

CB 93-02

COMPUTER MODELING OF TIME-DEPEND-ENT RIME ICING IN THE ATMOSPHERE Lozowski, E.P., et al, Jan. 1983, 74p., ADA-126 404,

19 refs. Oleskiw, M.M.

37-3497

3/-349/
AIRCRAFT ICING, ICE ACCRETION, TIME FACTOR, ICE FORMATION, COMPUTERIZED SIMULATION, HELICOPTERS, MATHEMATICAL MODELS.

CAL MODELS.

A numerical model of rime ice accretion on an arbitrary two-dimensional airfoil is presented. The physics of the model are described and results are presented that demonstrate, by comparison with other theoretical data and experimental data, that the model predictions are believable. Results are also presented that illustrate the capability of the model to handle time-dependent rime ice accretion, taking into account the feedback between the ice accretion and the airflow and droplet trajectory fields.

CR 83-03 ASSESSMENT OF THE TREATABILITY OF TOXIC ORGANICS BY OVERLAND FLOW. Jenkins, T.F., et al, Jan. 1983, 47p., ADA-126 384,

Refa. p.28-30. Leggett, D.C., Parker, L.V., Oliphant, J.L., Martel, C.J., Foley, B.T., Diener, C.J. 37-3498

WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, TEMPERATURE EF-FECTS, SLOPES, WATER POLLUTION, AB-SORPTION, WATER FLOW.

SORPTION, WATER FLOW.

The removal efficiency for 13 trace organics in wastewater was studied on an outdoor, prototype overland flow land treatment system. The removal for each of these substances was greater that 94% at an application rate of 0.4 cm/hr. The percent removals declined as application rates were increased. The rate of removal from solution was described by the sum of two mass-transport-limited, first-order rate coefficients representing volatilization and sorption. A model based on the two-film theory was developed; the observed removal rate coefficients were regressed against three properties of each substance: the Henry's constant, the octanol-water partition coefficient and the molecular weight. The dependence of the removal process on temperature was studied and is included along with average water

depth in the model. The decrease in removal rate as temperature declined is supported by the known dependence of Henry's constant and diffusivity on temperature. The model was validated on a second overland flow system. The surface soil concentrations of the trace organics determined Ine surface soil concentrations of the trace organics determined at the end of the experiment suggest that a secondary mechanism renews the surface activity rapidly enough so that contaminants do not build up on the surface, with the possible exception of PCB. Biodegradation is suggested as the predominant secondary mechanism rather than volatilization because substances less volatile than PCB were not found at the end of the experiment.

ICE GROWTH ON POST POND, 1973-1982. Gow, A.J., et al, Feb. 1983, 25p., ADA-126 334, 15

Govoni, J.W. 40-4676

ICE GROWTH, ICE DETERIORATION, PONDS, SNOW ICE, ICE COVER THICKNESS, METEOROLOGICAL FACTORS, SEASONAL VARIATIONS, ICE MODELS, DEGREE DAYS, STEFAN PROBLEM, UNITED STATES—NEW HAMPSHIRE—POST POND.

STEFAN PROBLEM, UNITED STATES—NEW HAMPSHIRE—POST POND.

Measurements and analysis of seasonal ice growth and decay on Post Pond, New Hamsphire, for the period 1973-1982 are presented. Observations included ice thickness measurements, examination of the various ice types contributing to the ice cover, and measurements of meteorological parameters for correlation with and modeling of the ice growth process. The overall nature of ice growth and decay (ice loss) on Post Pond has been ascertained, the seasonal variability in the timing of freeze-up and ice-out and the duration of the ice cover have been determined, and the relationship of ice growth to freezing-degree-day records evaluated on the basis of a Stefan conduction equation modified to deal with ice sheets covered with or free of snow. Ice growth occurs predominantly by the direct freezing of lake water, but snow ice may compose as much as 50% of the ice cover in winters with higher than average snowfall. Freeze-up leading to the establishment of a stable ice cover occurs during the 4-week period from the end of November to the end of December. Maximum seasonal ice thicknesses were from 45 to 67 cm and are generally attained during the first two weeks of March; ice-out, marking the final disappearance of ice from Post Pond, usually occurs by the third week of April. The overall rate of ice loss is three to four times that of ice growth, and is dominated initially by melting from the top. As much as 50% of the ice may be lost in this way before the onset of any bottom melting. Final dissipation of the ice cover is usually expedited by canding resulting from preferential melting and disintegration of the ice at crystal boundaries.

CR 83-05

CR 83-05 DYNAMIC ICE-STRUCTURE INTERACTION DURING CONTINUOUS CRUSHING.
MEETIEREN, M., Feb. 1983, 48p., ADA-126 349, 22

37-3441

ICE SOLID INTERFACE, OFFSHORE STRUCTURES, PILE STRUCTURES, ICE PRESSURE, DYNAMIC LOADS, ICE LOADS, VELOCITY, TESTS.

TESTS.

This report presents the results of dynamic ice-structure interaction model tests conducted at the CRREL Ice Engineering Facility. A flexible, single-pile, bottom-founded offshore structure was simulated by a test pile with about a one-to-ten scale ratio. Ures (instead of sodium chloride) was used as dopant to scale down the ice properties, resulting in good model ice properties. Six ice fields were frozen and 18 tests carried out. In all cases distinctive dynamic ice-structure interaction vibrations appeared, from which abundant data were collected. In tests with linear ice velocitys sweep, sawtooth-shaped ice force fluctuations occurred frust. With increasing velocity the natural modes of the test pile were excited and shifts from one mode to another occurred. sweep, sawtooth-shaped ice force fluctuations occurred first. With increasing velocity the natural modes of the test pile were excited, and shifts from one mode to another occurred. The maximum ice force values appeared mostly with low loading rates, but high forces appeared randomly at high core velocities. As a general trend, ice force maximums, averages and standard deviations decreased with increasing ice velocities. The aspect ratio effect of the ice force in coninuous crushing follows the same dependence as in static loadings. The frequency of observed ice forces is strongly dominated by the natural modes of the structure. Dynamically unstable natural modes tend to make the developing ice force frequencies the same as the natural frequencies.

CR 83-06 CHEMICAL FRACTIONATION OF BRINE IN THE MCMURDO ICE SHELF, ANTARCTICA. Cragin, J.H., et al, Mar. 1983, 16p., ADA-127 821, 23 refs.

Gow. A.J., Kovacs, A.

ICE CORES, ICE SALINITY, ICE COMPOSITION, ICE SHELVES, ICE PHYSICS, ANTARCTICA— MCMURDO SOUND.

During the austral summers of 1976-77 and 1978-79, several ice cores were taken from the McMurdo lee Shelf brine zone to investigate its thermal, physical and chemical properties. Chemical analyses of brine samples from the youngest (uppermost) brine wave show that it contains sea salts in normal seawater proportions. Purther inland, deeper and

older brine layers, though slightly highly saline (3 > 200%), are severely depleted in (S04)2-/Na+ ratio being an order of magnitude less than that of normal seawater. Analyses of Na+, K+, Ca2+, Mg2+, (S04)2- and C1-, together with solubility and temperature considerations, show that of Ni+, K+, Ca2+, Mg2+, (So4)2- and Cl-, together with solubility and temperature considerations, show that the tuiflate depletion is due to selective precipitation of mirabilite, Na2S041OH2O. The location of the inland boundary of brine penetration is closely related to the depth at which the brine encounters the firn/ice transition. However, a small but measurable migration of brine is still occurring in otherwise impermeable ice; this is attributed to eutectic dissolution of the ice by concentrated brine as it moves into deeper and warmer parts of the McMurdo Ice Shelf. (Auth.)

CR 83-07

ANALYSIS OF DIFFUSION WAVE FLOW ROUTING MODEL WITH APPLICATION TO FLOW IN TAILWATERS

Ferrick, M.G., et al, Mar. 1983, 31p., ADA-128 142, 18 refs.

Bilmes, J., Long, S.E.

39-1252

DAMS, WATER FLOW, WATER WAVES, HY-DROLOGY, RIVER FLOW, FLOW MEASURE-MENT, MATHEMATICAL MODELS, DIFFU-

SION.

Peak power generation with hydropower creates tailwater flow conditions characterized by high and low flows with abrupt transitions between these states. Flows occurring in tailwaters typically form sharp-fronted, large-amplitude waves of relatively short period. An understanding of the mechanics of downstream propagation of these waves is important both for direct application in studies of the tailwater and because of the similarity of these waves to those following a dam break. An analysis of the dynamic equations of open channel flow is used to quantify the relative importance of flow wave convection, diffusion and dispersion in rivers. The relative importance of each process is related to the relative magnitude of terms in the dynamic equations, providing a physical basis for model formulation. A one-dimensional diffusion wave flow routing model, modified for tailwaters, simulates the important physical processes affecting the flow and is straightforward to apply. The model is based upon a numerical solution of the kinematic wave equation.

PROPERTIES OF UREA-DOPED ICE IN THE CREEK TEST BASIN.

Hirayama, K., Mar. 1983, 44p., ADA-128 219, 34 refs. 38-4416

38-4416
DOPED ICE, UREA, ICE STRENGTH, ICE
COVER THICKNESS, ICE MECHANICS, HYDRAULICS, FLEXURAL STRENGTH, ICE MODELS, AIR TEMPERATURE, TESTS.

ELS, AIR TEMPERATURE, TESTS.

In the course of model tests with ures-doped ice in the CRREL lee Engineering Facility test basin, the growth process and the physical and mechanical properties of the model ice were investigated. The perameters which were varied were: urea concentration in the tank water, air temperature during growth, growth duration, and tempering time. Uniformity of ice thickness and ice mechanical properties over the whole tank area were found to be satisfactory. The structure of the urea-doped ice was found to be similar to that of the ice except for a relatively thick incubation layer over a dendritic bottom layer. Empirical relationships were established between: ice thickness and negative degree-hours; mechanical properties and growth temperature, urea concentration, and ice thickness; and reduction in mechanical properties and tempering time. The results of the study are presented in charts which permit reliable scheduling of model tests with required ice thickness and ice flexural strength. trength

SHORE ICE RIDE-UP AND PILE-UP FEA-TURES. PART 1: ALASKA'S BEAUFORT SEA

Kovacs, A., Mar. 1983, 51p., ADA-127 198, 24 refs.

FAST ICE, ICE PILEUP, ICE OVERRIDE, SEA ICE, SHORES, SHORELINE MODIFICATION, BEACHES, BEAUPORT SEA.

BEACHES, BEAUPORT SEA.

Recent observations of shore ice pile-up and ride-up along the coast of the Alaska Beaufort Sea are presented. Information is given to show that sea ice movement on shore has overridden steep coastal bluffs and has thrust inland over 150 m, gouging into and pushing up mounds of beach sand, gravel, boulders and peat and, inland, the tundra material. The resulting ice scar morphology was found to remain for tens of years. Onshore ice movements up to 20 m are relatively common, but those over 100 m are very infrequent. Spring is a dangerous time, when sea ice melts away from the shore, allowing ice to move freely. Under this condition, driving stresses of less than 100 kPa can push thick sea ice onto the land.

COMPUTER MODELS FOR TWO-DIMEN-SIONAL STEADY-STATE HEAT CONDUCTION. Albert, M.R., et al, Apr. 1983, 90p., ADA-128 793, 8

Phetteplace, G.E.

PERMAPROST HEAT TRANSFER, PERMAPROST PHYSICS, FROST ACTION, THERMAL CONDUCTIVITY, UNDERGROUND PIPELINES, BOUNDARY LAYER, COMPUTER PROGRAMS, MATHEMATICAL MODELS.

This report outlines the development and verification of two computer models of two-dimensional steady-state heat conduction including a variety of boundary conditions. One is a finite difference program and the other is a finite element program. The results of each program are compared to two analytic solutions, and to one another.

RADAR PROFILING OF BURIED REFLEC-TORS AND THE GROUNDWATER TABLE. Sellmann, P.V., et al, Apr. 1983, 16p., ADA-130 225, 17 refs.

Arcone, S.A., Delaney, A.J. 38-544

RADAR ECHOES, SEASONAL FREEZE THAW, WATER TABLE, SUBSURFACE INVESTIGA-TIONS, PROFILES, GROUND WATER, SOIL FREEZING, GROUND THAWING.

PREZING, GROUND THAWING. Investigations of ground radar performance over thawed and seasonally frozen silts, and sands and gravels containing artificial and natural reflectors were carried out in Alaska. The radar emitted 5-10 ns pulses, the center frequency of which was approximately 150 MHz. The artificial reflectors were metal sheets and discs and the natural reflectors were the groundwater table and interfaces between frozen and thawed material.

CR 83-12 COMPUTER MODELS FOR TWO-DIMEN-SIONAL TRANSIENT HEAT CONDUCTION. Albert, M.R., Apr. 1983, 66p., ADA-134 893, 9 refs.

38-877 HEAT TRANSFER, FREEZE THAW CYCLES, HEAT PIPES, HEATING, MATHEMATICAL MODELS, COMPUTERIZED SIMULATION, PHASE TRANSFORMATIONS.

PHASE TRANSFORMATIONS.
This paper documents the development and verification of two finite difference models that solve the general two-dimensional form of the heat conduction equation, using the alternative-direction implicit method. Both can handle convective, constant flux, specified temperature and semi-infinite boundaries. The conducting medium may be composed of many materials. The first program, ADI, solves for the case where no change of state occurs. ADIPC solves for the case where a freeze/thaw change of phase may occur, using the apparent heat capacity method. Both models are verified by comparison to analytical results.

CR 83-13

REVIEW OF THE PROPAGATION OF INELAS-

TIC PRESSURE WAVES IN SNOW. Albert, D.G., Apr. 1983, 26p., ADA-128 714, 35 refs.

SNOW BLASTICITY, EXPLOSIVES, WAVE PROPAGATION, PRESSURE, ELASTIC WAVES, DETONATION WAVES, TESTS.

DETONATION WAVES, TESTS.

A review on past experimental and theoretical work indicates a need for additional experimentation to characterize the response of snow to inelastic pressure waves. Pressure data from previously conducted explosion tests are analyzed to estimate the elastic limit of snow of 400 kg/cu m density to be shout 36 kPs. This pressure corresponds to a scaled distance of 1.6 m/kg exp 1/3 for charges fired beneath the surface of the snow, and to a scaled distance of 1.2 m/kg exp 1/3 for charges fired in the air. The effects of a soon cover on the method of clearing a minefield by using an explosive charge fired in the air shove the snow surface are also discussed and recommendations are given for further work in this area. Explosive pressure data are used to estimate the maximum effective scaled radius for detonating buried mines at shallow depth to be 0.8 kg exp 1/3. Fuel-air explosive will increase this effective radius significantly because of the increase in the size of the source region. the source region.

STUDY ON THE TENSILE STRENGTH OF ICE AS A FUNCTION OF GRAIN SIZE. Curtier, J.H., et al, May 1983, 38p., ADA-134 889, 30

Schulson, B.M., St. Lawrence, W.F. 38-2189

38-2189
ICE CRYSTAL STRUCTURE, TENSILE PROPERTIES, ICE STRENGTH, ICE CRACKS, GRAIN SIZE, ICE DEFORMATION, COMPRESSIVE PROPERTIES, BRITTLENESS, FRACTURING.

An analysis of ice fracture that incorporates dislocation mechanics and linear elastic fracture mechanics is discussed. The derived relationships predict a brittle to ductle transition in polycrystalline ice under tension with a Hall-Petch type

dependence of brittle fracture strength on grain size. A uniaxial tensile testing technique, including specimen preparation and loading system design was developed and employed to verify the model. The tensile strength of ice in purely brittle fracture was found to vary with the square root of the reciprocal of grain size, supporting the relationship that the theory suggests. The inherent strength of the ice lattice and the Hall-Petch slope are evaluated and findings discussed in relation to previous results. Monitoring of decusted in the tests, providing insights into the process of microfracture during ice deformation.

CR 83-15

LAKE WATER INTAKES UNDER ICING CON-**DITIONS**

Dean, A.M., Jr., May 1983, 7p., ADA-128 757, 52 38-4418

WATER INTAKES, ICE CONDITIONS, ICE PRE-VENTION, LAKE WATER, ICE MECHANICS, DESIGN CRITERIA, ICING.

An intake may be restricted or clogged by active frazil, passive frazil, brash, or a combination of these ice forms. The exact nature of the interactions among the intake structure, the ice and the hydraulic and meteorological conditions that lead to icing problems is extremely site-specific. The better these parameters are quantified, the more tailored and economical the solution. A defense against these ice forms may be formulated in four arms, the critical of the ice. these parameters are quantified, the more tailored and sconomical the solution. A defense against these ice forms may be formulated in four areas: the origin of the ice, the transportation mechanics of the ice, the accumulation characteristics of the ice, and the form of the ice when it is in the area of influence of the intake. To produce a lake intake structure that minimizes or eliminates icing problems, one may devise an unconstrained or a constrained design. To evaluate solutions to icing problems and/or to supplement incomplete data, a scale-model investigation is recommended. A universal, unconstrained solution would be extremely expensive. The more data available through site monitoring and model studies, the better the problem (and therefore the solution) can be bracketed. This paper provides guidance for developing a site-specific solution.

CR \$3-16 DEVELOPING A MODEL FOR PREDICTING SNOWPACE PARAMETERS AFFECTING VEHI-CLE MOBILITY.

Berger, R.H., May 1983, 26p., ADA-134 878, Refs. p.23-26. 38-878

SNOW COVER EFFECT, TRAFFICABILITY, VEHICLES, SNOW DEPTH, SNOW DENSITY, SNOW ACCUMULATION, ABLATION, TEM-PERATURE EFFECTS, MODELS.

The presence of snow on the ground can impose limitations on the mobility of wheeled and tracked vehicles. Snow depth and density are the two most easily messured snow properties that can be related to mobility over snow. properties that can be related to mobility over snow. Existing models of snowpack accumulation and ablation processes and models of internal snowpack structure were examined to determine if a model of the snowpack can be developed for use in predicting the snow parameters that affect mobility. Simple models, such as temperature index models, do not provide sufficient snowpack details, and the more detailed models required too many measured inputs. Components of the various models were selected from a basis of a snowpack model for predicting anow properties related to mobility over snow. Methods of obtaining the input data for some components are suggested, and areas where more development is needed are described.

COMPARISON OF SEA ICE MODEL RESULTS USING THREE DIFFERENT WIND FORCING

Tucker, W.B., June 1983, 11p., ADA-134 462, 11 refs.

ICE MODELS, SEA ICE, WIND PRESSURE, ICE MECHANICS, ATMOSPHERIC PRESSURE, ICE COVER THICKNESS.

A sea ice model was applied to the Bast Greenland Sea to examine a 60-day ice advance period beginning 1 October 1979. This investigation compares model results using driving geostrophic wind fields derived from three sources. Winds calculated from sea-level pressures obtained from the driving geostrophic wind fields derived from three sources. Winds calculated from see-level pressures obtained from the National Westher Service's operational analysis system resulted in strong velocities concentrated in a narrow band adjacent to the Greenland coast, with moderate velocities elsewhere. The model showed excessive ice transport and thickness build-ups in the coastal region. The extreme pressure reduction procedure that was applied to the terrain-following sigms coordinate system to obtain sea-level pressures. Additional sea-level pressure fields were obtained from an independent optimal interpolation analysis that merged FGGE buoys drifting in the Arctic basin with high latitude land stations and from manual digitization of the NWS hand-analyzed Northern Hemisphere Surface Charts. Modeling results using winds derived from both of these fields agreed favorably. CR 83-18 DETECTION OF CAVITIES UNDER CON-CRETE PAVEMENT

Kovacs, A., et al, July 1983, 41p., ADA-131 851, 10

Morey, R.M. 38-470

CONCRETE PAVEMENTS, CAVITATION, RADAR ECHOES, DETECTION, CRACKING (FRACTURING), PROFILES.

(FRACTURING), PROFILES.

An evaluation of an impulse radar system for detecting cavities under concrete pavement is discussed, and field results are presented. It was found that a dual antenna mode of surveying was ideal for void detection. In this mode one antenna operated in a transceive mode and a second, offset from the first, operated in a receive-only mode. This arrangement allowed a refraction-type profile survey to be performed, which enabled subpavement voids to be easily detected. Field trials were held at Plattubial Air Force Base, where 28 cavities were detected and mapped. Drilling of holes verified that a cavity existed and allowed asvity depth to be measured. The cavities varied from 1.5 in. to 23 in. in depth and were up to 20 ft long. CPB 23-16

CR 83-19 ICE FORCES ON MODEL BRIDGE PIERS. Haynes, F.D., et al, July 1983, 11p., ADA-133 082, 20

Sodhi, D.S., Kato, K., Hirayama, K. 38-395

ICE PRESSURE, ICE LOADS, ICE SOLID INTER-PACE, ICE PUSH, ICE MECHANICS, BRIDGES, PIERS, ICE STRENGTH, MODELS, FLEXURAL STRENGTH, TESTS.

STRENGTH, TESTS.
Small-scale laboratory experiments were conducted on model bridge piers in the CRREL test basin. The experiments were performed by pushing model ice sheets against structures and monitoring the ice forces during the ice/structure interaction. The parameters, varied during the test program, were the geometry of the bridge piers and the velocity, thickness, and flexural strength of the ice. The results are presented in the form of ice forces on aloping and vertical structures with different geometries. During ice sction on aloping structures, a phenomenon of transition of failure mode from bending to crushing was observed as the ice velocity was steadily increased.

CR 83-20 LAND TREATMENT RESEARCH AND DEVEL-OPMENT PROGRAM: SYNTHESIS OF RE-SEARCH RESULTS.

Iskandar, I.K., et al, Aug. 1983, 144p., ADA-134 540, Refs. p.63-124.

Wright, E.A. 38-4419

WASTE TREATMENT, WATER TREATMENT, SANITARY ENGINEERING, LAND RECLAMA-TION, DESIGN CRITERIA, RESEARCH PRO-

JECIS.

The major objective of the Corps of Engineers Land Treatment Research and Development Program was to provide, through research, definitive criteria and procedures to enable the cost-effective and environmentally safe use of land treatment of municipal wastewater. This research included long-term field experiments at different locations within the United States to establish design criteria, laboratory research to understand and solve fundamental problems, and evaluation of existing land treatment systems to decument least-term. understand and solve fundamental problems, and evaluation of existing land treatment systems to document long-term performance. The information gathered from the land treatment research program has been published in more than 240 technical publications on regional planning, site selection, design procedures, mechanisms of wastewater renovation, site management, site monitoring and environmental effects. During the land-treatment program an active technology transfer effort was maintained to transmit research results directly to users. The LTRP clearly demonstrated that land treatment is an attractive alternative to other waste treatment practices. It was also shown that the direct benefits of the program, in terms of increased cost-effectiveness from improved design, were much greater than the program's cost.

CR 83-21 STATISTICAL ASPECTS OF ICE GOUGING ON THE ALASKAN SHELF OF THE BEAUFORT SEA.

Weeks, W.F., et al, Sep. 1983, 34p. + map, ADA-134 428, Refs. p.32-34. Barnes, P.W., Rearic, D.M., Reimnitz, E.

38-880
ICE SCORING, OCEAN BOTTOM, BOTTOM
TOPOGRAPHY, OFFSHORE DRILLING, OFFSHORE STRUCTURES, SEA ICE, STATISTICAL
ANALYSIS, BEAUFORT SEA.

ANALYSIS, BEAUFORT SEA.

The statistical characteristics of ice-produced gouges in the sea floor along a 190-km stretch of the Alaskan coast of the Beaufort Sea between Smith Bay and Camden Bay are studied, based on 1500 km of precision fathometry and side-looking sonar records that were obtained between 1972 and 1979 in water depths to 38 m. The probability density function of the gouge depths into the sediment is represented by a simple negative exponential over four decades of gouge frequency. The deepest gouge observed was 3.6 m, from a semple of 20,354 gouges that have depths greater than

or equal to 0.2 m. The dominant gouge orientations are usually unimodal and reasonably clustered, with the most frequent alignments roughly parallel to the seneral trend of the coastline. The value of the mean number of gouges (deeper than 0.2 m) per kilometer measured normal to the trend of the gouges, varies from 0.2 for protected lagoons to 80 in water between 20 and 38 m deep in unprotected offshore regions. The distribution of the spacings between gouges as measured along a sampling track is a negative exponential. The form of the frequency distribution of the mean number of gouges varies with water depth and is exponential for lagoons and shallow offshore areas, positively skewed for 10 to 20 m depths off the barrier islands, and near-normal for deeper water. As a Poisson distribution gives a reasonable fit to the mean number of gouges distributions for all water depths, it is suggested that gouging can be taken as approximating a Poisson process in both space and time. The distributions of the largest values per kilometer of gouge depths, gouge widths, and heights of the lateral embankments of sediments plowed from the gouges are also investigated. Limited data on gouging rates give an average of 5 gouges per kilometer per year. Examples are given of the application of the data set to hypothetical design problems associated with the production of oil from areas in the Alaskan portion of the Beaufort Ses.

TRANSPORT OF WATER IN FROZEN SOIL. 1. EXPERIMENTAL DETERMINATION OF SOIL-WATER DIFFUSIVITY UNDER ISOTHERMAL CONDITIONS.

Nakano, Y., et al, Aug. 1983, 8p., ADA-135 419, For another source see 37-4218. 13 refs.
Tice, A.R., Oliphant, J.L., Jenkina, T.F.

38-4462

FROZEN GROUND MECHANICS, SOIL WATER MIGRATION, FROST HEAVE, UNFROZEN WATER CONTENT, SOIL MECHANICS, WATER TRANSPORT, ANALYSIS (MATHEMATICS), EXPERIMENTATION.

A new experimental method for measuring the soil-water diffusivity of frozen soil under isothermal conditions is introduced. The theoretical justification of the method is presented and the feasibility of the method is demonstrated by experiments conducted using marine-deposited clay. The measured values of the soil-water disavity are found comparable to reported experimental data.

STRESS MEASUREMENTS IN ICE. Cox, G.F.N., et al, Aug. 1983, 31p., ADA-133 906, 29

Johnson, J.B. 38-4463

ICE PHYSICS, STRESSES, LOADS (FORCES), ICE CREEP, ICE BLASTICITY, MEASURING INSTRUMENTS, ANALYSIS (MATHEMATICS),

he problems associated with measuring stresses in ice are releviewed. Theory and laboratory test results are then resented for a stiff cylindrical sensor made of steel that presented for a stiff cylindrical sensor made of steel that is designed to measure ice stresses in a biaxial stress field. Loading tests on freshwater and saline ice blocks containing the biaxial ice stress sensor indicate that the sensor has a resolution of 20 kPa and an accuracy of better than 15% under a variety of uniaxial and biaxial loading conditions. Principal stress directions can also be determined within 5 deg. The biaxial ice stress sensor is not significantly affected by variations in the ice elastic modulus, ice creep or differential thermal expansion between the ice and guage. The sensor also has a low temperature sensitivity (5 kPa degC).

CR 83-24

SENSITIVITY OF PLANT COMMUNITIES AND SOIL FLORA TO SEAWATER SPILLS, PRUDHOE BAY, ALASKA.

Simmons, C.L., et al, Sep. 1983, 35p., ADA-136 619, 22 refs.

Everett, K.R., Walker, D.A., Linkins, A.B., Webber,

TUNDRA, VEGETATION, SEA WATER, POLLU-TION, ENVIRONMENTAL IMPACT, WATER TREATMENT, SALT WATER, SOIL WATER, SOIL MICROBIOLOGY, ROOTS, DAMAGE.

SOIL MICROBIOLOGY, ROOTS, DAMAGE.
Secondary recovery of oil at Prubho Bay, Alaska, will involve transporting large quantities of seawater in elevated pipelines across tundra for injection into oil-bearing rock strata. The possibility of a pipeline rupture raises questions concerning the effects of seawater on tundra vegetation and soils. To evaluate the relative sensitivities of different plant communities to seawater, eight sites representing the range of vegetation types along the pipeline route were reasted with single, saturating applications of seawater during the summer of 1980. Live (green) bryophyte cover was markedly reduced in the moist experimental sites in 1981. Bryophytes in all but one of the wet-site experimental plots were apparently unaffected by the seawater treatment. Two species of foliose lichers treated with seawater showed marked deterioration in 1981. All other lichen taxa were apparently unaffected by the seawater treatment. On spill sites, microbial-related soil respiration and hydrolysis of cellulose and organic phosphorus were significantly reduced, as were soil

enzymes and viable microbial biomass, for up to one year after treatment. Ectomycorrhizal roots of Salix on the treated plots showed a significant reduction in viable biomass, number of mycerrhizal roots. of mycorrhizal roots, and respiration rates of the

CR 83-25

ICE ACTION ON PAIRS OF CYLINDRICAL AND CONICAL STRUCTURES.

Kato, K., et al, Sep. 1983, 35p., ADA-134 595, 22 refs. Sodhi, D.S. 38-881

38-861 BRIDGES, PIERS, ICE LOADS, OFFSHORE STRUCTURES, ICE PRESSURE, ICE SOLID IN-TERFACE, COMPRESSIVE PROPERTIES, PLEX-URAL STRENGTH, TESTS.

URAL STRENGIH, TESTS.

lee action on two cylindrical and conical structures, located side by side, has been investigated in a small-scale experimental study to determine the interference effects on the ice forces generated during ice-structure interaction. The proximity of the two structures changes the mode of ice failure, the magnitude and direction of ice forces on the individual structure, and the dominant frequency of ice force variations. Interference effects were determined by comparing the experimental results of tests at different structure spacings.

CR 83-26
MECHANICAL ICE RELEASE PROCESSES.
PROM HIGH-SPEED 1 SELF-SHEDDING FROM HIGH-SPEED RO-TORS.

Itagaki, K., Oct. 1983, 8p., ADA-135 369, 19 refs. 38-4465

ICE REMOVAL, PROPELLERS, ICING, ICE AC-CRETION, SUPERCOOLED FOG, ICE FORMA-TION, ICE ADHESION, ICE STRENGTH, ICE CONTROL, TENSILE PROPERTIES, ANALYSIS (MATHEMATICS).

(MATRIBMATICS).

Les accreted on high-speed rotors operating in supercooled fog can be thrown off by centrifugal force, creating severe unbalance and dangerous projectiles. A simple force balance analysis indicates that the strength of accreted ice and its adhesive strength can be obtained by measuring the thickness of the accretion, the location of the separation, the rotor speed and the density. Such an analysis was applied to field and laboratory observations of self-shedding events. The results agree reasonably well with other observations.

DRIVING TRACTION ON ICE WITH ALL-SEA-SON AND MUD-AND-SNOW RADIAL TIRES. Blaisdell, G.L., Nov. 1983, 22p., ADA-136 115, 9 refs. 38-2555

RUBBER ICE FRICTION, TRACTION, TIRES, RUBBER SNOW FRICTION, ICE TEMPERA-TURE, ADHESION, DESIGN.

TURE, ADHESION, DESIGN.

This study reports on a comparison of the driving traction performance on ice of a selected group of all-season radial tires with mud-and-snow radial tires. In addition to performance variation due to tread design, the effects of tire inflation pressure and ice temperature are explored. The results indicate that no significant tractive advantage on ice can be attributed to tread design. The contribution of tire tread to traction on ice is completely overshadowed by adhesion between the ice and the compound which makes up the tire's contact surface. Based on adhesion, a slight favoring of all-season tires is found. Increasing ice temperature generally decreased the tractive capability of a specific tire. For several tires, however, the opposite was true. Reduced inflation pressure also caused a slight decrease in the tractive performance parameters calculated.

CR 83-28 LONG-TERM PLANT PERSISTENCE AND RES-TORATION OF ACIDIC DREDGE SOILS WITH SEWAGE SLUDGE AND LIME.
Palazzo, A.J., Dec. 1983, 11p., ADA-137 451, 31 refs.

38-1658

DREDGING, SOIL CHEMISTRY, SEWAGE TREATMENT, REVEGETATION, LIMING, SLUDGES, LAND RECLAMATION, GRASSES. SLUDGES, LAND RECLAMATION, GRASSES. A field study was conducted to determine whether sewage aludge and lime could be useful as soil amendments on acidic (pH 2.4) and infertile dredged spoils and to evaluate grasses that may be suitable for restoring acidic dredged spoils. Applications of dolomitic limestone in combination with sewage sludge or commercial fertilizer and topsoil mythorous soil fertility and produced a better overall growth environment at the site. Metal concentrations resulting from sludge applications increased but not to excessive levels. Movement of metals below the 20-cm depth was noted for the extractible forms of zinc, copper and nickel. A total of 29 grass treatments, containing grasses seeded alone or in combinations and receiving the sludge/lime treatment, were evaluated over a seven-year period, and selected grasses were analyzed for mineral composition. All grass species showed good establishment on the amended acidic spoil. CR 83-29 OF PERENNIALLY FROZEN STREAMBANKS

Lawson, D.B., Dec. 1983, 22p., ADA-138 410, Refs.

p.14-17. 38-4466

SHORE EROSION, PERMAPROST THERMAL PROPERTIES, BANKS (WATERWAYS), FROZ-EN GROUND STRENGTH, SOIL EROSION, STABILITY, GULLIES, SHORELINE MODIFICA-TION, STREAMS, TEMPERATURE EFFECTS, HYDRAULICS.

review indicated that the effects of perm nk erodibility and stability are not yet under because systematic and quantitative measurements are serious-ly lacking. Consequently, general controversy exists as to whether perennially frozen ground inhibits lateral eroin and bankline recession, or whether it increases bank recession and banktine recession, or whether it increases bank recession rates. Perennially frozen streambanks erode because of modification of the bank's thermal regime by exposure to air and water, and because of various erosional processes. Pactors that determine rates and locations of erosion include physical, thermal and structural properties of bank sediments, stream hydraulics and climate. Thermal and physical modification of streambanks may also induce accelerated erosion within permafrost terrain removed from the immediate river environment. Bankline or bluffline recession rates are highly variable, remains from less than 1 m/west to very 30 m/year environment. Bankine or olumine recession rates are again, variable, ranging from less than 1 m/year to over 30 m/year and, exceptionally, to over 60 m/year. Long-term observations of the physical and thermal erosion processes and systematic ground surveys and measurements of bankline-biuffline recession rates are needed.

CR 83-30

ICE SHEET RETENTION STRUCTURES. Perham, R.E., Dec. 1983, 33p., ADA-138 030, Refs.

p.27-29. 38-4467

ICE CONTROL, ICE BOOMS, STABILIZATION, ICE SHEETS, ICE COVER, FRAZIL ICE. Ice sheets are formed and retained in several ways in nature, and an understanding of these factors is needed before most

structures can be successfully applied. Many ice sheet retention structures float and are somewhat flexible; others are fixed and rigid or semirigid. An example of the former is the Lake Brie ice boom and of the latter, the former is the Lake Erie ice boom and of the latter, the Montreal ice control structure. Ice sheet retention technology is changing. The use of timber cribs is gradually but not totally giving way to sheet steel pilings and concrete cells. New structures and applications are being tried but with caution. Ice-hydraulic analyses are helpful in predicting the effects of structures and channel modifications on ice cover formation and retention. Often, varying the flow rate in a particular system at the proper time will make the difference between whether a structure will or will not retain ice. The structure, however, invariably adds reliability to the sheet ice retention process.

CR 83-31 MECHANICS OF ICE JAM FORMATION IN RIVERS.

Ackermann, N.L., et al, Dec. 1983, 14p., ADA-138 371, For another version see 36-3281. 12 refs. Shen, H.T.

ICE JAMS, ICE FORMATION, ICE MECHANICS, RIVER ICE, RIVER FLOW, HYDRAULICS, ICE CROSSINGS, COMPUTER PROGRAMS, MATHEMATICAL MODELS.

A mathematical model is described that is used to determine the maximum ice conveyance capacity of a river channel. Based upon this model, computer programs were developed that enable the ice discharge to be calculated for steady-state flow conditions. For rivers that have uniform flow, the maximum ice-conveying capacity can be described with a simple function expressed in terms of the size of the ice fragments, channel geometry, and the flow of water in the river. For nonuniform flows, the computer program determines the elevation profile of the surface layer in addition to other flow characteristics, such as the velocity and surface concentration of the ice fragments. The location along this surface profile where the ice conveyance capacity becomes less than the upstream supply is determined and is considered to be the position where a surface ice jam or ice bridge will be formed. A mathematical model is described that is used to determine to be the positi will be formed.

ICE FORCE MEASUREMENTS ON A BRIDGE PIER IN THE OTTAUQUECHEE RIVER, VER-MON

Sodhi, D.S., et al, Dec. 1983, 6p., ADA-139 425, 2

Kato, K., Haynes, F.D.

ICE LOADS, ICE PLOES, PIERS, BRIDGES, ICE PRESSURE, RIVER ICE, WATER LEVEL, ICE STRENGTH, ICE MECHANICS.

lee forces on a bridge pler in the Ottauquechee River, in Quechee, Vermont, were measured by installing four panels—each capable of measuring forces in the normal and tangential direction—on both sides of a vertical V-shaped pier nose. The measured forces are presented for a short period during an ice run. After the ice run, the thickness and sizes

of the ice floes were measured and the compressive strength of the ice was determined in the laboratory from the ice samples collected along the river banks. The water level measurements made at several locations along the river are also presented for the period of the ice run.

THERMODYNAMIC MODEL OF CREEP AT CONSTANT STRESSES AND CONSTANT STRAIN RATES.

Fish, A.M., Dec. 1983, 18p., ADA-139 883, Refs. p.16-18. 38-4470

SOIL CREEP, FROZEN GROUND THERMODY-NAMICS, FROZEN GROUND MECHANICS, ICE MECHANICS, STRESSES, STRAINS, RHEOLO-GY, MATHEMATICAL MODELS.

A thermodynamic model has been developed that for the first time describes the entire creep process, including primary, secondary, and tertiary creep, and failure for both constant stress (CS) tests and constant strain rate (CSR) tests, in the form of a unified constitutive equation and unified failure criteria. Deformation and failure are considered as a single criteria. Deformation and failure are considered as a single thermoactivated process in which the dominant role belongs to the change of entropy. Failure occurs when the entropy change is zero. At the moment the strain rates in CS tests reach the minima and stress in CSR tests reaches the maximum (peak) values. Families of creep and stress-strain curves, obtained from uniaxial compression CS and CSR tests of frozen soil, respectively (both presented in dimensionless coordinates), are plotted as straight lines and are superposed, confirming the unity of the deformation and failure process and the validity of the model. A method is developed for determining the parameters of the model, so that creep deformation and the stress-strain relationship of ductile materials such as soils can be predicted based upon information obtained from either type of test.

IN-SITU BUILDING R-VALUE TOWARD MEASUREMENT.

Flanders, S.N., et al, Jan. 1984, 13p., ADA-139 917,

Marshall S.I.

THERMAL CONDUCTIVITY, BUILDINGS, THERMAL INSULATION, WALLS, HEAT FLUX, TEMPERATURE MEASUREMENT, INFRARED PHOTOGRAPHY, ACCURACY

PHOTOGRAPHY, ACCURACY.

A technique for measuring the thermal resistance (R-value) of large areas of building envelope is under development temploys infrared thermography to locate radiant temperature extremes on a building surface and to provide a map of normalized temperature values for interpolation between locations. Contact thermal sensors (thermocouples for temperature and thermopiles for heat flow) are used to calculate the R-value at specific locations by summing the output from each sensor until the ratio between temperature difference from inside to outside surface and heat flow converges to a constant value. R-value measurements of a wood frame insulated wall were within 13% of the expected theoretical value. Similar measurements of a masonry wall were 31 and 43% less than expected. Experimentation demonstrated that a large ratio between temperature difference was the single most important variable affecting accuracy and speed of convergence. Thermal guards around heat flow sensors were of little value, according to both experimentation and computer simulation. Attempts to match the absorptivity of sensors with their surroundings may have been insufficent to diminish about 10% of the remaining error in measurement. Lateral heat flow and convection may have been significant problems for accuracy in the masonry construction. Currently, an investigator cannot rely on the literature for guidance in assessing the limitations on accuracy for in-situ building R-value measurement.

ELECTROMAGNETIC PROPERTIES OF SEA ICE.

Morey, R.M., et al, Jan. 1984, 32p., ADA-140 330, 26 refa

Kovaca, A., Cox, G.F.N.

38-4472 ICE ELECTRICAL PROPERTIES, SEA ICE ELECTROMAGNETIC PROPERTIES, DIELEC-TRIC PROPERTIES, ELECTRICAL RESISTIVITY, ICE SPECTROSCOPY, ICE CRYSTAL STRUC-TURE, ANISOTROPY, BRINES.

TURE, ANISOTROPY, BRINES.
Investigations of the in situ complex dielectric constant of sea ice were made using time-domain spectroscopy. It was found that (1) for sea ice with a preferred horizontal crystal c-axis alignment, the anisotropy or polarizing properties of the ice increased with depth, (2) brine inclusion conductivity increased with decreasing temperature down to about -8. (3 twhich point the conductivity decreased with decreasing temperature of the complex dielectric constant is strongly dependent upon brine volume but less dependent upon the brine inclusion orientation, (5) the tengendary part of the complex dielectric constant was strongly dependent upon brine volume. Because the electromagnetic (EM) properties of sea ice are dependent upon the physical state of the ice, which is continually changing,

it appears that only trends in the relationships between the EM properties of natural sea ice and its brine volume and brine inclusion microstructure can be established.

CTR 84-03 MODEL TESTS ON TWO MODELS OF WIGH 140-POOT ICEBREAKER.

Tatinclaux, J.C., Jan. 1984, 17p., ADA-139 882, 10 38.4473

ICEBREAKERS, ICE COVER STRENGTH, ICE CONDITIONS, ICE BREAKING, UREA, DOPED ICE MODELS.

The results of resistance tests in level ice and broken ice channels are presented for two models of the WTGB 140-ft icebreaker at scales of 1:10 and 1:24, respectively. No scale effect on the resistance in level ice could be detected between the two models. From the test results an empirical predictor equation for the full scale ice resistance is derived. Predicted resistance is compared against, and found to be 25 to 40% larger than, available full-scale values estimated from thrust measurements during full-scale trials of the Great Lakes icebreaker Katmai Bas

CR 84-04

EFFECTIVENESS AND INFLUENCES OF THE NAVIGATION ICE BOOMS ON THE ST.

Perham, R.E., Jan. 1984, 12p., ADA-139 908, 8 refs. 38-4474

ICE NAVIGATION, ICE BOOMS, RIVER ICE, ICE BREAKING, ICE CONTROL, ICE BREAKUP. ICE MECHANICS, ICE COVER THICKNESS.

Ice problems developed in the Sault Ste. Marie, Michigan, portion of the St. Marys River because of winter navigation. Passing ships and natural influences moved ice from Soo Harbor into Little Rapids Cut in sufficient quantities to Harbor into Little Rapids Cut in sumicient quantities to jam, cause high water in the harbor, and prevent further ship passage. After physical model and engineering studies, two ice booms with a total span of 1375 ft (419 m) with a 250-ft (76-m) navigation opening between were installed at the head of Little Rapids Cut in 1975. A modest field study program on the booms was conducted for the ensuing four winters to determine ice and boom interaction and the effects of ship passages on the system. Excess ensuing four winters to determine ice and boom interaction and the effects of ship passages on the system. Forces on some anchors were recorded and supplemental data were taken by local personnel. Several reports have been written about the booms' early operations. This paper presents a four-year summary of the main effects of the boom on left of the boom on the four winter sessons, the small quantities of ice lost over and between the booms were manageable. Ships usually passed through the boom without influencing the boom force levels, but at times they brought about large changes. One boom needed strengthening, and artificial islands were added for upstream ice stability. Coast Guard icebreakers were also a necessary part of winter navigation in this area.

MORPHOLOGY AND ECOLOGY OF DIATOMS IN SEA ICE FROM THE WEDDELL SEA Clarke, D.B., et al, Feb. 1984, 41p., ADA-141 994,

Refs. p.12-14. Ackley, S.F., Kumai, M. 38-4501

ICE COMPOSITION, ALGAE, PACK ICE, SEA ICE, PLANKTON, ICE CORES, ICE COVER THICKNESS, ICE SALINITY, ECOLOGY, CLAS-SIFICATIONS, WEDDELL SEA.

SIFICATIONS, WEDDELL SEA.

Diatom species composition and relative abundances were determined for ice cores obtained from Weddell Sea pack ice during the October-November 1981 Weddell Polynya expedition (WEPOLEX). Ice thickness and salinity indicate that the ice was less than one year old. The predominant ice type (70%) was frazil, which has the capacity to mechanically incorporate biological material through nucleation and scavenging.

Diatoms were found throughout the length of the cores. Species showed down-core fluctuations in ice type. Pennate forms were more abundant than centrica, the average ratio being 16:1. Diatom frustules with intact crasmic material were more abundant (50 million cells/liter). rage ratio being 16:1. material were more the average ratio being 16:1. Diatom frustules with must organic material were more abundant (50 million cells/liter). Differences in species abundances are attributed initially to incorporation of algal cells from a temporally changing water column and subsequently to diatom reproduction within the ice. Scanning electron micrographs illustrating the morphologic characteristics of the predominant species are includ-

CD SAME AEROSOL GROWTH IN A COLD ENVIRON-

Yen, Y.-C., Feb. 1984, 21p., ADA-139 907, 4 refs. 38-4475

ABROSOLS, GROWTH, HEAT TRANSFER, MASS TRANSFER, VAPOR DIFFUSION, COLD WEATHER TESTS, ANALYSIS (MATHEMATICS), DROPS (LIQUIDS), TEMPERATURE EF-ICS), D FECTS.

An expression relating aerosol growth to cold environmental conditions was developed. This was accomplished by solving the diffusion equation with the method of Laplace transformation. The series solution was expressed in terms of the ratio of vapor density over droplet surface to droplet density, ratio of environmental vapor density at time zero to vapor

sity over droplet surface, and ratio of product of diffusion fficient and time to square of initial radius of condensation censity over dropest surface, sno result or product or diminsion coefficient and time to square of initial radius of condensation nucleus. To take into account the variation of the vapor density over the surface of an acidic condensation nucleus due to the continuous dilution of the droplet, the solution was obtained by assuming various levels of constant vapor

CR 84-07 FORCE DISTRIBUTION IN A FRAGMENTED ICE COVER

Stewart, D.M., et al, Mar. 1984, 16p., ADA-142 100,

Daly, S.F. 38-4476

ICE FLOES, SHEAR STRESS, FLOATING ICE, LOADS (FORCES), ICE BOOMS, ICE LOADS, RIVER ICE, ICE COVER THICKNESS, SHORES, EXPERIMENTATION.

Experiments were conducted in CRREL's refrigerated flume facility to examine the two-dimensional force distribution of a floating, fragmented ice cover restrained by a boom in a simulated river channel. To determine the force distribution, a vertically walled channel, instrumented for m a simulate inver channel. To determine the force distribution, a vertically walled channel, instrumented for measuring normal and tangential forces, and an instrumented for measuring boom were installed in a 40.0 by 1.3-m flume. Two sizes of polyethylene blocks and two similar sizes of freshwater ice blocks were tested using water velocities ranging from 10 to 30 cm/s. The forces measured at the instrumented boom leveled off with increasing cover length. The contribution of the increasing shear forces developed along the shorelines to this leveling off in the data was clearly evident. The shear coefficients of the polyethylene blocks averaged 0.43, and the freshwater ice averaged 0.044. The normal force measured along the instrumented shoreline could not be related simply by a K coefficient to the longitudinal force; another expression was required, with a term being a function of the cover thickness and independent of the undercover shear stress or cover length. By adding this term, good agreement was then found between the measured and predicted values of the boom forces and the shoreline normal and shear forces.

CR 84-08

MECHANICAL PROPERTIES OF MULTI-YEAR SEA ICE. TESTING TECHNIQUES.

Mellor, M., et al, Apr. 1984, 39p., ADA-144 431, 17 refs.

Cox, G.F.N., Bosworth, H.

ICE MECHANICS, SEA ICE, STATIC LOADS, COMPRESSIVE PROPERTIES, TENSILE PROP-ERTIES, EQUIPMENT, ICE SAMPLING, TESTS. ERTIES, EQUIPMENT, ICE SAMPLING, TESIS. This report describes the equipment and procedures that were used for acquiring, preparing and testing samples of multi-year sea ice. Techniques and procedures are discussed for testing ice samples in compression and tension at constant strain rates and constant loads, as well as in a conventional triaxial cell. A detailed account is given of the application and measurement of forces and displacements on the ice test specimens under these different loading conditions.

CR 84-09 MECHANICAL PROPERTIES OF MULTI-YEAR PHASE 1: TEST RESULTS.

Cox, G.F.N., et al, Apr. 1984, 105p., ADA-144 132, 21 refs.

Richter-Menge, J.A., Weeks, W.F., Mellor, M., Bosworth, H.

ICE MECHANICS, SEA ICE, PRESSURE RIDGES, ICE STRENGTH, COMPRESSIVE PROPERTIES, TENSILE PROPERTIES, STATIC LOADS, ICE PHYSICS, ICE SAMPLING, ICE FLOES, STATISTICAL ANALYSIS.

FLOES, STATISTICAL ANALYSIS.

This report presents the results of the first phase of a test program designed to obtain a comprehensive understanding of the mechanical properties of multi-year sea ice from the Alaakan Beaufort Sea. In Phase I, 222 constant-strain-rate uniaxial compression tests were performed on ice samples from ten multi-year pressure ridges to examine the magnitude and variation of ice strength within and between pressure ridges. A limited number of constant-strain-rate compression and tension tests, constant-load compression tests, and conventional triaxial tests were also performed on ice samples from a multi-year floe to provide preliminary data for developing ice yield criteria and constitutive laws for multi-year sea ice. Data are presented on the strength, failure strain, and modulus of multi-year sea ice under different loading conditions. The statistical variation of ice strength within and between pressure ridges is examined, as well as the effects of ice temperature, porosity, structure, strain rate to of ice temperature, porosity, structure, strain rat confining pressure on the mechanical properties of multi sea ice.

CR 84-10 MODELING TWO-DIMENSIONAL FREEZING USING TRANSFINITE MAPPINGS AND A MOVING-MESH FINITE ELEMENT TECH-NIQUE

Albert, M.R., May 1984, 45p., ADA-144 131, 29 refs. 39-383

FREEZING, PHASE TRANSFORMATIONS, HEAT TRANSFER, BOUNDARY VALUE PROB-LEMS, MATHEMATICAL MODELS, LATENT HEAT.

HEAT.

Preezing phase change problems in conduction heat transfer represent a set of moving boundary problems for which much interest currently exists. In the work presented here, two-dimensional freezing is modeled by incorporating the use of transfinite mappings with a moving-mesh finite element technique. The use of transfinite mapping in governing interior mesh motion is shown to provide very acceptable results and is demonstrated to be the most efficient. acceptable results and is demonstrated to be the most efficient general computational technique used to date. The model developed is capable of using either Cartesian or (r,z) cylindrical coordinates. Both frozen and unfrozen phases may be modeled when conduction governs behavior in both. In the case of freezing of a fluid as it flows through a pipe the usefulness of always having the phase boundary coincident with element boundaries is demonstrated. Results of the model are shown to compare well with analytical and experimental results. A von Neumann stability analysis is performed for the numerical solution and tends to support the observation that the occurrence of a high Peclet number in the moving-mesh model of heat conduction may produce distortions of the numerical solution.

SEA ICE DATA BUOYS IN THE WEDDELL SEA. Ackley, S.F., et al, May 1984, 18p., ADA-144 953, 6

Holt, B.T. 39-384

SEA ICE DISTRIBUTION, PACK ICE, DRIFT, WEATHER OBSERVATIONS, DRIFT STATIONS, ATMOSPHERIC PRESSURE, AIR TEMPERATURE, ANTARCTICA—WEDDELL SEA.

Data obtained from two sets of data buoys either air-dropped or deployed by ship onto the Weddell Sea pack ice during the period from Dec 1978 to Nov 1980 are presented. The buoy data include position, pressure and temperature information and to date represent the most complete combined The buoy data include position, pressure and temperature information and to date represent the most complete combined weather and pack ice drift records for the ice-covered southern ocean regions. The buoys tended to drift north initially and then to turn east generally between initiales 62 S and 64 S. Buoy 1433 turned east farther south at approximately 67 S but at about the same time as buoy 0527, implying that the westerly wind belt was farther south than usual in 1979. The range of air pressures—from about 950 mb to about 1020 mb—is typical of the circumpolar low pressure trough in the Southern Hemisphere. All buoys were equipped with an internal or compartment temperature sensor. The buoys also contained an enternal air temperature sensor in a ventilated, shielded can at 1—nheight. Although differences of 10 C or more between recorded air and compartment temperatures are common, the correlation between the two measured temperatures is generally very good. The compartment temperatures is generally very good. The compartment temperatures are the found that subtracting 3 C from the average daily compartment temperature for any given day. This technique can be used to construct average daily air temperature records for the 1979 buoys which only contained the internal or compartment temperature sensor. aperature sensor.

CR 84-12 ICING RATE ON STATIONARY STRUCTURES UNDER MARINE CONDITIONS. Itagaki, K., June 1984, 9p., ADA-145 797, 7 refs. 39-385

ICING, OFFSHORE STRUCTURES, ICE FORMATION, OFFSHORE DRILLING, SHIP ICING, SEA SPRAY, WIND VELOCITY, ANALYSIS (MATH-EMATICS)

The rate of ice accumulation on stationary structures was calculated using published data. The results were compared with icing measured on board ships. Although the general trend of this calculation indicated parallelism with the coboard measurements, the measured ice accumulation rate on ships needed a 5 to 8 m/s higher windspeed to correspond with the calculated rate for stationary structures.

CR 84-13

NITROGEN REMOVAL IN WASTEWATER PONDS. Reed, S.C., June 1984, 26p., ADA-144 971, 26 refs.

WASTE TREATMENT, ICE COVER EFFECT, WATER TREATMENT, SANITARY ENGINEER-ING, PONDS, CHEMICAL ANALYSIS, MATH-EMATICAL MODELS.

Nitrogen removal from wastewater can be required in a number of situations, and many military facilities have been or will be retrofitted for this purpose. Treatment lagoons and holding or storage ponds are a common treatment method or a common component in many systems. Qualitative observations over several decades document nitrogen losses

from these systems due to a variety of possible biochemical interactions. This analysis is based on an extensive body of quantitative data recently published by the U.S. EPA. A mathematical model was developed and validated that indicated that nitrogen removal from pond systems is dependent on pH, temperature, and detention time. The specific biochemical factors could not be isolated, but the analysis suggests that volatilization of ammonia is the major pathway for nitrogen loss. The model can be used as a design equation for new facilities, for retrofits, and for land treatment systems with storage ponds, since nitrogen is a critical design perameter in these cases.

CR 84-14

EFFECTS OF LOW TEMPERATURES ON THE GROWTH AND UNFROZEN WATER CONTENT OF AN AQUATIC PLANT.

Palazzo, A.J., et al, June 1984, 8p., ADA-147 107, 24

Tice, A.R., Oliphant, J.L., Graham, J.M.

98-804
PLANT TISSUES, TEMPERATURE EFFECTS,
UNFROZEN WATER CONTENT, COLD TOLERANCE, LOW TEMPERATURE TESTS, GROWTH,
DAMAGE, NUCLAR MAGNETIC RESONANCE, AQUATIC PLANTS.

Two laboratory studies were performed to investigate the effects of low temperatures on the equatic plant Ceratophyllum dimensum L. Whole plants were subjected to low-temperature treatments of +4, 0 and -6C for 48 hours, and regrowth dimersiant. Whole plants were subjected to low-temperature treatments of +4,0 and -6C for 48 hours, and regrowth
was compared to an untreated control. The control and
+4C-treated plants gained weight, while visible injury and
reductions in plant biomass were noted 30 days after treatment
at the two lower temperatures. The -6C treatment killed
the plants, while the OC treatment injured them to some
degree. In another phase of this study, nuclear magnetic
resonance (NMR) analysis of plant buds, leaves and stems
showed that lowering temperatures caused the plants' unifrozen
water content to drop rapidly as the temperature approached
-5C, then slowly as temperatures approached -13C. From
-13C to -22C there was little change in unfrozen water
content. The results show that toe in this plant causes
injury that affects subsequent regrowth; temperatures of 6C or below can actually kill them. This killing temperature
was also near the point where frozen water content increased
only slightly with lower temperatures. NMR analysis could
be one way of determining plant tolerance to cold. It
appears from this study that this weedy species is susceptible
to low-temperature injury, and subjecting this plant to cold
may be a promising method of weed control in northern
lakes.

BASELINE ACIDITY OF ANCIENT PRECIPITA-TION FROM THE SOUTH POLE.

Cragin, J.H., et al, June 1984, 7p., ADA-145 007, 33

Giovinetto, M.B., Gow, A.J. 39-387

ICE COMPOSITION, ICE CORES, DRILL CORE
ANALYSIS, PRECIPITATION (METEOROLOGY), CHEMICAL PROPERTIES, FIRN, PALEOCLIMATOLOGY, ANTARCTICA—AMUNDS-ANTARCTICA—AMUNDS-BN-SCOTT STATION.

BN-SCOTT STATION.

Measurements of meltwater pH from annual layers of South Pole firm and ice samples ranging in age from 40 to 2000 years B.P. show that precipitation at this remote site has a higher natural acidity than that expected from atmospheric equilibrium with CO2. The average pH of deserated (CO2-free) samples was 5.64, while sir-equilibrated samples averaged 5.37, a pH that is about a factor of two more acidic than the expected background pH of 5.65. The observed "excess" acidity can be accounted for actual SOC and SO use expected userground pri or 3.63. The observed "excess" scidity can be accounted for by natural SO4 and NO3 lon levels in the samples probably originating from non-anthropogenic H2SO4 and HNO3. Because of the presence of these naturally occurring acids in South Pole precipitation, a pH of 5.4 is considered a more representative baseline reference pH for acid precipitation studies.

CR 84-16

EFFECTS OF SOLUBLE SALTS ON THE UN-FROZEN WATER CONTENTS OF THE LANZ-HOU, P.R.C., SILT.

Tice, A.R., et al, June 1984, 18p., ADA-152 825, 24

Zhu, Y., Oliphant, J.L. 39-2916

JOURNAL WATER CONTENT, SALINE SOILS, LOESS, SOIL WATER, SOLUBILITY, TEMPERATURE EFFECTS, ELECTRICAL

Phase composition curves are presented for a typical saline silt from Lanzhou, P.R.C., and compared to some silts from Alaska. The unfrozen water content of the Chinese silts much higher than that of the Alaskan silts due to the large amount of soluble salts present in the silts from China, which are not present in silt from interior Alaska. When the salt is removed, the unfrozen water content is then similar for both the Chinese and Alaskan silt. Here we introduce a technique for correcting the unfrozen water content of partially frozen soils due to high sait concentrations. We calculate the equivalent moisity of the saits in the unfrozen water at various temperatures from a measurement of the electrical conductivity of the extract from saturated

PULSE TRANSMISSION THROUGH FROZEN SILT.

Arcone, S.A., July 1984, 9p., ADA-147 108, 19 refs. 39.803

PROZEN GROUND PHYSICS, RADIO WAVES, WAVE PROPAGATION, PERMAFROST SICS, RADAR, TEMPERATURE EFFECTS.

SICS, RADAR, TEMPERATURE EFFECTS.

VHF-band radiowave short pulses were transmitted within the permafrost tunnel at Fox, Alaska, over distances between 2.2 and 10.5 m. The propagation medium was a frozen silt containing both disseminated and massive lee with temperatures varying from -7C near the transmitter to probably -3C near the center of the tunnel overburden. The short pulses underweat practically no dispersion in the coldest zones but did disperse and refract through the warmer overburden, as suggested by calculations of the effective dielectric constant. Most significantly the measured frequency content decreased as the effective dielectric constant increased. The results indicate that deep cross-borehole miss transmistent occressed as the execute desectors constant increased. The results indicate that deep, cross-borehole pulse transmissions over distances greater than 10 m might be possible, especially when the ground is no warmer than -4C. The information thus gained could be used for identifying major subsurface variations, including ground ice features.

CR 84-19

FRAZIL ICE FORMATION.

Ettema, R., et al, July 1984, 44p., ADA-147 425, 34 refs.

Karim, M.F., Kennedy, J.F.

40.3413

FRAZIL ICE, ICE FORMATION, HEAT TRANS-FER, PARTICLE SIZE DISTRIBUTION, MATH-EMATICAL MODELS, TESTS, TURBULENT FLOW, WATER TEMPERATURE, COMPUTER PROGRAMS, SUPERCOOLING.

PROGRAMS, SUPERCOOLING.

This report investigates the influences of turbulence and water temperature on frazil ice formation. The rate and the quantity of frazil ice formed in a specified volume of supercooled water increase with both increasing turbulence intensity and decreasing water temperature. The influence of turbulence intensity on the rate of frazil ice formation, however, is more pronounced for larger initial supercooling. The turbulence characteristics of a flow affect the rate of frazil ice formation by governing the temperature to which the flow can be supercooled by influencing heat transfer from the frazil ice to surrounding water, and by promoting collision nucleation, particle and floc rupture and increasing the number of nucleation sites.

Larger frazil ice particles and flor rupture and increasing the number of nucleation sites.

Larger frazil ice particles and flow affect the rate of frazil ice particles greater than their thickness. Particle size generally decreased with increasing turbulence intensity.

The report rate of frazil ice formation of liquid water to ice. Experiments conducted in a turbulence jar with a heated, vertically oscillating grid served both to guide and to calibrate the analytical model as well as to afford insights into frazil ice formation.

The formation of frazil ice formation.

The formation of frazil ice formation.

The formation of frazil ice formation of supercooled water ranging from -0.9 to -0.05 C.

CR 84-19 FORECASTING WATER TEMPERATURE DE-CLINE AND FREEZE-UP IN RIVERS Shen, H.T., et al, July 1984, 17p., ADA-147 068, 14

Foltyn, B.P., Daly, S.F.

39-802

ICE FORMATION, RIVER ICE, WATER TEM-PERATURE, PREEZEUP, LONG RANGE PORE-CASTING, COMPUTER PROGRAMS.

CASTING, COMPUTER PROGRAMS.

In this study a method for making long-range forecasts of freeze-up dates in rivers is developed. The method requires the initial water temperature is an upstream station, the long-range air temperature forecast, the predicted mean flow velocity in the river reach, and water temperature response parameters.

The water temperature response parameters can be either estimated from the surface heat exchange coefficient and the average flow depth or determined empirically from recorded air and water temperature data. The method is applied to the St. Lawrence River between Kingston, Ontario, and Massena, New York, and is shown to be capable of accurately forecasting freeze-up.

CHANGE IN ORIENTATION OF ARTILLERY-DELIVERED ANTI-TANK MINES IN SNOW. Bigl, S.R., Aug. 1984, 20p., ADA-090 946, 5 refs. 39-2917

MILITARY OPERATION, TANKS (COMBAT VEHICLES), SNOW COVER EFFECT, ORIENTA-TION, TEMPERATURE EFFECTS, TESTS.

TION, TEMPERATURE EFFECTS, TESTS.

The Remote Anti-Armor Mine System (RAAMS) employs acatterable mines that are delivered by ejection from a projectile during flight. A problem with delivery of RAAMS mines in snow arises because a percentage of them are equipped with an anti-disturbance mechanism. The natural disturbance or tilting of the mines while melting into the snow on a warm or sunny day may cause them to detonate. Five tests lasting 3 hours to 5 days were conducted at CRREL to study change in orientation of RAAMS mines after landing in snow. Mines were set in the snow at

various repose angles and their orientations were recorded periodically. The tests indicated that a critical angle of approximately 65 deg from horizontal divides the settlement patterns of the mines. Those with initial repose angles below 65 deg will tend towards 0 deg, while more steeply dipping mines will most often come to rest in a vertical position. Angular change rates during midday hours (0900-1500) ranged from 0 deg to 10 deg per hour. On sunny dates with secretaring temperatures. ranged from 0 deg to 10 deg per hour. On sunny days with near-freezing temperatures, most mines had a total one-day change of 10 deg to 25 deg. From these tests, it appears that many of the mines would have detonated if they had been equipped with an anti-disturbance mechanism.

CR \$4-21 IMPACT OF DREDGING ON WATER QUALITY AT KEWAUNEE HARBOR, WISCONSIN. Iskandar, I.K., et al, Aug. 1984, 16p., ADA-148 321,

16 refs. Cragin, J.H., Parker, L.V., Jenkins, T.F. 40-3546

DREDGING, SEDIMENTS, WASTE DISPOSAL, WATER POLLUTION, LACUSTRINE DEPOSITS, WATER CHEMISTRY, PORTS, UNITED STATES WISCONSIN--KEWAUNEE

Six sediments and four water samples were collected from Kewamee, Wisconsin, in 1981, prior to dredging of this Lake Michigan harbor: A modified elutrate text was used to estimate potential impact on water quality upon harbor dredging and disposal of the sediments in a confined facility. to estimate potential impact on water quality upon harbor dredging and disposal of the sediments in a confined facility. The modification of the test included a comparison between containment release under serated vs unserated conditions and filtered vs unfiltered elutrates. Statistical analysis showed that the differences in the chemical characteristics between the filtered and unfiltered samples were significant for soluble reactive P and all the tested metals except Cu. Ni, Fe, Mm) and soluble reactive P will be released to the water if the effluent is not filtered. Under aerated conditions, COD in both the filtered and unfiltered samples was higher than under unserated conditions. In contrast, total organic carbon was much higher under the unserated condition than under serated conditions. The study concluded that sediment and contuninant releases from the confined disposal facility (CDF) to the harbor water were less than those from the Kewaunee River input. Also, retention of effluent in the CDF for about four days decreased the suspended solids in the effuent to about 40 to 50 mg/L, which is similar to the concentration in the lake water. The use of sand filters should not be for routine operation but rather for emergency cases when there is not enough time for effluent retention in this CDF. but rather for emergency cases when there is not enough time for effluent retention in this CDF.

REGIONAL AND SEASONAL VARIATIONS IN SNOW-COVER DENSITY IN THE U.S.S.R.

Bilello, M.A., Aug. 1984, 70p., ADA-148 429, Refs. p.55-58. 39-1140

SNOW COVER DISTRIBUTION, SNOW DENSITY, SNOW SURVEYS, SNOW DEPTH, TOPOGRAPHIC EFFECTS, GEOGRAPHY, SEASONAL VARIATIONS, WIND VELOCITY, FOREST VARIATIONS, WIND VE CANOPY, MAPPING, USSR.

CANOPY, MAPPING, USSR.
Regional and seasonal variations in snow-cover density (SCD) in the U.S.S.R. were determined through the analysis of data obtained from all available Soviet literature. A relation-hip found between observed winter wind speeds and SCD values recorded from November through March made it possible to develop a snow-density map of the U.S.S.R. The map was divided snow-density map of the U.S.S.R. The map was divided into five general categories of SCD, ranging from values less than or equal to 0.21 g/cu cm at interior stations with very light winds to values greater than or equal to 0.31 g/cu cm at arctic locations with strong winds. Since this literature survey indicated that the reported Soviet SCD values were incorrect due to instrustrong winds. Since this literature survey indicated that the reported Soviet SCD values were incorrect due to instrumental errors, adjustments to the data in this study were required. Month-to-month investigation of the SCD data revealed a gradual increase in density from November to March and that the SCD values under forest canopies averaged from 4 to 14% lower than those recorded in open areas. Also included in this report are 1) a compilation of pertinent passages in the Soviet literature on SCD, 2) a map showing the location of SCD measurements, and 3) an average winter wind speed chart for the U.S.S.R.

CR 84-23 EFFECT OF SNOW ON VEHICLE-GENERATED SEISMIC SIGNATURES

Albert, D.G., Aug. 1984, 24P., ADB-090 976, 10 refs. 40-35ÁA

MILITARY OPERATION, SNOW COVER EF-FECT, SEISMOLOGY, DETECTION, VEHICLES, ATTENTUATION, ACOUSTICS, SEASONAL VARIATIONS.

VARIATIONS.

Vehicle-generated seismograms recorded under summer and winter conditions at Fort Devens, Massachusetts, are analyzed and compared. The data were recorded using three-component geophones located just beneath the ground surface and microphones mounted on tripods 0.3 m tall. Winter data were recorded when a 0.7-m-thick snow cover was present. The filtering effect of this snow cover on the seismic data was striking. The appearance and frequency content of the recorded ground modion changed dramatically from summer to winter because snow attenuates the acoustic-to-seismic coupled energy. These changes were verified by magnitude-squared coherence analysis and by a simple Wiener prediction

model. Automatic vehicle classification algorithms will have to account for these effects if the algorithms are to operate successfully in the presence of snow.

CR 84-24

CRYSTALLINE STRUCTURE OF UREA ICE SHEETS USED IN MODELING EXPERIMENTS IN THE CRREL TEST BASIN.

Gow. A.J., Sep. 1984, 48p., ADA-148 434, 29 refs.

ICE CRYSTAL STRUCTURE, UREA, SEA ICE, ICE MECHANICS, GRAIN SIZE, ICE MODELS, ICE SHEETS, TESTS.

ICE SHEETS, TESTS.

This report describes the growth characteristics and crystalline textures of urea ice sheets which are now used extensively in the CRREL test besin for modeling sea ice. The sims of the report are to describe the different kinds of crystalline texture encountered in urea ice sheets and to show that even small variations in texture can drastically influence the mechanical behavior of urea ice sheets. Standard petrographic techniques for studying microstructure in thin sections were used on 24 urea ice sheets. These investigations entailed observations of the crystalline texture of the ice (including details of the subgrain structure), grain size measurements, and studies of the nature and extent of urea entrapment and drainage patterns in the ice. Increased knowledge of the factors controlling the crystalline characteristics of urea ice sheets has progressed to the point where test basin researchers at CRREL are now able to fibricate ice sheets with prescribed structures leading to predictable mechanical properties. predictable mechanical properties.

CR 84-25 REVIEW OF ANTITANK OBSTACLES FOR WINTER USE.

Richmond, P.W., Sep. 1984, 12p., ADB-100 767L, 24 refe

TANKS (COMBAT VEHICLES), DETONATION WAVES, MILITARY OPERATION, SNOW COVER EFFECT, ICE COVER EFFECT, BORE-HOLES, MODELS, DRILLING, AUGERS.

HOLES, MODBLS, DRILLING, AUGERS.
This report is a review of information, equipment and procedures related to the use of antitizak obstacles in winter. Demolition and construction of expedient and existing obstacles are discussed. Obstacle performance models are identified and their methodology is discussed. Five tasks are identified as areas requiring further research: 1) investigation of the use of light-weight sugers for drilling bore holes in frozen soil, 2) investigation of the effectiveness of Sovietisyle snow obstacles, 3) development of a model of vehicle performance on snow-covered slopes, 4) development of a design procedure and performance model for step-type obstacles when anow covered, and 5) development of construction procedures for creating ice slopes.

SHORE ICE RIDE-UP AND PILE-UP FEA-TURES. PART 2 ALASKA'S BEAUFORT SEA COAST-1983 AND 1984.

Kovacs, A., Sep. 1984, 28p. + map, ADA-148 428, 16

39-1142 ICE OVERRIDE, ICE PILEUP, SEA ICE DISTRIBUTION, ICE MECHANICS, FAST ICE, BEACHES, SHORES, BEAUFORT SEA, ARCTIC ACHES, OCEAN.

Observations of shore ice pile-up and ride-up along the Alaska Beaufort Sea coast in 1983 and 1984 are presented. New information on historical accounts of onshure ice movement, uncovered since publication of Part 1 in this series, is reported. An account is given of ice overtopping a concrete caisson exploration island in the Canadian Beaufort

RADAR INVESTIGATIONS ABOVE THE TRANS-ALASKA PIPELINE NEAR FAIR-

Arcone, S.A., et al, Oct. 1984, 15p., ADA-150 303, 15

Delaney, A.J. 39-2098

39-2098

RADAR ECHOES, UNDERGROUND PIPE-LINES, REMOTE SENSING, FREEZE THAW CY-CLES, WATER TABLE, WATER CONTENT, RE-FRACTION, UNITED STATES—ALASKA— FAIRBANKS.

FAIRBANKS.
Radar and wide-angle reflection and refraction (WARR) profiles were obtained across three buried sections of the trans-hisaks pipeline near Fairbanks in late April 1983. A broad-bank, pulsed radar operating in the VHF (very high frequency) range was used. The surficial geology at the three sites consisted of gravel (dredge tallings), silt and alluvium, respectively, and the sites were marginally frozen or completely thawed. May the sites were marginally frozen or completely thawed. At the gravel site the pipe (approximately 2 m deep) and an underlying water table were easily visible. There was no radar signature of the pipe at the silt site: the WARR profiles verified the high absorption of the material. The response was marginal at the alluvium conditions about the pipe makes radar a generally poor choice for mapping freeze-thaw boundaries but a good choice for estimating material state and moisture content. estimating material state and moisture of

POLYETHYLENE GLYCOL AS AN ICE CON-TROL COATING.

Itagaki, K., Dec. 1984, 11p., ADA-150 466, 13 refs. 40-3577

PROTECTIVE COATINGS, ICE CONTROL, ICE PREVENTION, RESINS, MELTING POINTS, SNOW ACCUMULATION, ICE ACCRETION, COUNTERMEASURES, TESTS.

The properties of polyethylene glycol (PBG) as a sacrificial ice control coating are discussed. PBG is effective longer than many single component coatings, and it has low toxicity and a high flash point. The results of preliminary experiments on PBG's ability to control snow accumulation on a panel and ice accumulation on a cryogenic tank are also

REVERSE PHASE HPLC METHOD FOR ANALYSIS OF TNT, RDX, HMX AND 2,4-DNT IN MU-

NITIONS WASTEWATER.

Jenkins, T.F., et al, Dec. 1984, 95p., ADA-155 983, Refa. p.36-38.

Bauer, C.F., Leggett, D.C., Grant, C.L. 40-3578

WATER POLLUTION, WASTE DISPOSAL, EXPLOSIVES, CHEMICAL ANALYSIS, DETECTION, TESTS, MILITARY FACILITIES, STATISTICAL ANALYSIS.

TICAL ANALISIS.

An analytical method was developed to determine the concentrations of HMX, RDX, TNT and 2,4-DNT in munitions wastewater. The method involves dilution of an aqueous sample with an equal volume of methanol-acconditive solvent mixture, filtration through a 0.4 micron polycarbonate membrane and analysis of a 100 microl. subsample by Reversephase, high-performance liquid chromatography using an LC-8 column. Retention times of these four analyses, their secondary and imputitive expected in wastewater. 8 column. Retention times of these four analytes, their degradation products, and impurities expected in wastewater matrices were determined for two eluent compositions. An eluent of 50% water, 38% methanol and 12% acctonitrile successfully separated HMX, RDX and TNT from each other and the potential interferents. The method provided linear calibration curves over a wide range of concentrations.

IMPACT OF SLOW-RATE LAND TREATMENT ON GROUNDWATER QUALITY: TOXIC OR-

Parker, L.V., et al, Dec. 1984, 36p., ADA-153 253, Refs. p.19-21.

Jenkins, T.F., Poley, B.T.

40-3361 GROUND WATER, WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, SEEPAGE, ORGANIC NUCLEI, ENVIRONMEN-TAL IMPACT

TAL IMPACT.

The removal efficiency for 16 organic substances in wastewater was studied on an outdoor, prototype slow-infiltration system. The initial concentration of each of these substances in the wastewater was approximately 50 microgram/L. Removal was via volatilization during spray application and subsequent adsorption in the soil. The percent removal during spraying could be estimated from the liquid-phase transfer coefficient; losses were up to 70% for the most volatile components. The total percent removal for the system, based on the concentration in the percolate, was more than 98% for all substances. Only chloroform, which has a low octanol-water coefficient and according to the literature is not degradable aerobically, was continuously detected in the percolate. The major final removal mechanisms are believed to be volatilization and biodegradation-biotransformation. Breakthrough of several other organics in early spring as a result of application during the colder months was also observed. The two substances that were PCBs were apparently slowly lost from the system, probably by volatilization. The behavior of diethylphthalate was different in the two soils tested but was more recalcitrant than expected. than expected

CR 84-31 DETECTION OF BURIED UTILITIES. VIEW OF AVAILABLE METHODS AND A COM-PARATIVE FIELD STUDY

Bigl, S.R., et al, Dec. 1984, 36p., ADB-090 068L, 21 refs.

Henry, K.S., Arcone, S.A

UNDERGROUND FACILITIES, UTILITIES, DE-TECTION, FROST PENETRATION, MAGNETIC SURVEYS, GEOPHYSICAL SURVEYS, EARTH-

WORK.

Locating buried utilities is often necessary for repair, servicing, or prevention of damage when earthwork is to be conducted in a particular area. Of the many methods available for detection of buried utilities, those in most wide-spread use are magnetic induction, magnetometry, and radiofrequency tracking. Comparative field tests of 11 locators using these three operating methods were conducted in Hanover, New Hampahire, and eight of these were further tested at the U.S. Military Academy, West Point, New York, and the Stewart Army Subpost, Newburgh, New York, and the Stewart Army Subpost, Newburgh, New York and the West Point and Newburgh, the nine sites included a variety of utility types including iron and steel pipe, cable, vitreous

tile and plastic, as well as different terrain and groundcover characteristics. Tests with the radiofrequency tracking locators were insufficient to evaluate their ability to locate nonmetallic pipe or to judge if one locator was superior to the other. Although not statistically different, slightly more accurate average readings were obtained with the magnetic induction and magnetometer instruments over cable than over pipe. Shallow utilities (<3.5 ft) were located slightly more accurately than deeper ones. In general, the low-to mid-priced magnetic induction locators appeared to be the most cost effective. Problems with accuracy in utility location occurred mainly at sites with steep topography owhere utilities were in very close proximity. Successful operation of the instruments required only a small amount of training.

SHORELINE EROSION PROCESSES: ORWELL

LAKE, MINNESOTA. Reid, J.R., Dec. 1984, 101p., ADA-152 952, Refs. p.34-56.

SHORE EROSION, SLOPE PROCESSES, LAKE WATER, BANKS (WATERWAYS), GROUND THAWING, SEDIMENT TRANSPORT, WATER WAVES, RESERVOIRS, SHORELINE MODIFICATION, RAIN, SEASONAL VARIATIONS, METEOROLOGICAL FACTORS.

METEOROLOGICAL FACTORS.

Orwell Lake, in west-central Minnesota, is a flood-control, water-management reservoir first impounded in 1953. Subsequent erosion of the shoreline and a lack of knowledge of slope erosion processes in this region prompted this study to identify and quantify the processes there. The processes were measured at selected sites between June 1980 and June 1983. Brosion of the banks is primarily caused by three processes: rain, frost thaw, and waves. The first two processes tend to move sediment to the base of the steep alopes, forming a relatively gentle surface of accumulation. Wave action then tends to move this sediment into the lake. Analysis of the data collected over three years has confirmed that wave action is the dominant erosion process, providing almost 77% of the erosion during the years has confirmed that wave action is the dominant crosson process, providing almost 77% of the crosson during the 1981-82 study year. During the 1981 high pool level, 2,089 Mg of sediment, mostly colluvium, was removed from the lower slopes by wave action striking the 1.62 km of croding shoreline. More than 4,300 Mg was croded by waves accompanying the higher pool levels of 1982.

ICE FORCES ON RIGID, VERTICAL, CYLIN-DRICAL STRUCTURES. Sodhi, D.S., et al, Dec. 1984, 36p., ADA-151 393, 32

refs. Morris, C.E.

39-2515 ICE PRESSURE, ICE LOADS, OFFSHORE STRUCTURES, COLD WEATHER CONSTRUCTION, PILES, ICE BREAKING, ICE SOLID INTERFACE, ICE COVER THICKNESS, FLEXU-RAL STRENGTH, COMPRESSIVE PROPERTIES, VELOCITY, EXPERIMENTATION.

VELOCITY, EXPERIMENTATION.

A small-scale experimental study was conducted to characterize the magnitude and nature of ice forces during continuous crushing of ice against a rigid, vertical, cylindrical structure. The diameter of the structure was varied from 50 to 500 mm, the relative velocity from 10 to 210 mm/s, and the tee thickness from 50 to 80 mm. The ice tended to fail repetitively, with the frequency of failure termed the characteristic frequency. The characteristic frequency varied linerally with velocity and to a small extent with structure diameter. The size of the damage zone was 10 to 50% of the ice thickness, with an average value of 30%. The maximum and mean normalized ice forces were strongly dependent on the aspect ratio (structure diameter/ice thickness) are the structure diameter to the sepect ratio (structure diameter/ice thickness). dependent on the aspect ratio (structure diameter/ice thickness). The forces increased significantly with decreasing aspect ratio, but were constant for large aspect ratio. The maximum normalized forces appeared to be independent of strain role.

PROTOTYPE DRILL FOR CORE SAMPLING FINE-GRAINED PERENNIALLY FROZEN GROUND.

Brockett, B.E., et al, Jan. 1985, 29p., ADA-152 388, 11 refs

Lawson, D.E. 40-3579

40-31/9
DRILLS, AUGERS, PERMAFROST THERMAL
PROPERTIES, FROZEN GROUND TEMPERATURE, CORING, SAMPLING, GROUND ICE,
GRAIN SIZE, TEMPERATURE EFFECTS, COST ANALYSIS.

ANALYSIS.

An inexpensive drill has been modified to provide researchers with the ability to suger an open hole or to acquire continuous, undisturbed 76-mm-diam core samples of a variety of perennially frozen materials that are suitable for chemical and petrographic analysis. It was developed by field testing in support of research from 1980 to 1983. Operation of the drill is based mainly on using a minimum of power to cut through frozen ground with tungsten carbide cutters on a CRREL coring suger. The ice content, temperature and grain size of the frozen sediments are important variables determining the sampling depth. Perennially frozen sediments with temperatures in the range of -0.5 C to -8.5

C have been continuously cored with this drill. Drilling and sampling are most efficiently conducted when ambient air temperatures are below freezing and the active layer is frozen. The self-contained lightweight drill is readily transportable off-road by helicopter or tracked vehicle, or by towing over roads. It is locally self-mobile by use of a winch. Total cost of the drill and modifications is estimated at approximately \$10,000.

CR 85-02 EFFECT OF NONUNIFORM SIZE ON INTER-NAL STRESSES IN A RAPID, SIMPLE SHEAR FLOW OF GRANULAR MATERIALS. PART 1. TWO GRAIN SIZES.

Shen, H.H., Feb. 1985, 18p., ADA-154 045, 18 refs.

SHEAR FLOW, PARTICLE SIZE PISTRIBUTION, MICROSTRUCTURE, MATERIALS, STRESSES, STRAINS, AVALANCHE MECHANICS, MATHEMATICAL MODELS.

Existing theories that predict the stress-strain rate relationship in a rapidly sheared granular flow can only treat materials that are made of single-size particles. However, granular flows usually involve materials of mixed sizes. It has been observed in many laboratory studies that size distribution has a significant effect on the flow of a granular material. Despite its importance, no quantitative theory has been devised that can explain the effect of size distribution. An analytical model is developed here to quantify the stresses in a mixture of spheres with two different sizes and identical material properties. Binary collisions between adjacent particles are considered as the dominating stress-generating mechanism. Comparisons between the theoretical results and the existing laboratory data show good agreement. Existing theories that predict the stress-strain rate relationship

EFFECT OF NONUNIFORM SIZE ON INTER-NAL STRESSES IN A RAPID, SIMPLE SHEAR FLOW OF GRANULAR MATERIALS. PART 2.

MULTIPLE GRAIN SIZES.
Shen, H.H., Feb. 1985, 20p., ADA-154 046, 19 refs.

SHEAR FLOW, PARTICLE SIZE DISTRIBUTION, MICROSTRUCTURE, STRESSES, MATERIALS,

SHEAR STRESS.

In the past all theoretical analyses for rapdily sheared granular flows assumed that the granular solids are either disks or spheres and are uniform in size.

However, natural materials that create these granular flows are in general irregular in shape and have various spectra of sizes. The stress and rate of energy dissipation levels in granular flows are significantly influenced by the size distribution. In part 1 of this report series (see 40-38, CR 85-2) the formulation of the contribution street in the stress of the street report series (see 40-38, CR 85-2) the formulation of the constitutive equations considering a two-size granular mixture is presented, where the ratio of the two sizes is nearly one. Here, in part 2, the constitutive equations for a two-size mixture are extended to include a general size ratio. In addition, a complete spectrum of size distribution is incorporated, which allows the quantification of the size distribution effect in the most general way. In analyzing the stresses, intergranular collision is assumed to be the major dynamic activity at the microscopic level. Because of the present limited knowledge of treating shape effects, the analysis is confined to the flow of either disks or spheres. The result of this work provides necessary information for a more realistic analysis of natural and industrial granular flows.

CR 85-04 PROPULSION TESTS IN LEVEL ICE ON A MODEL OF A 140-FT WTGB ICEBREAKER. Tatinclaux, J.C., Mar. 1985, 13p., ADA-154 075, 6

39-3956 39-39-30
ICEBREAKERS, ICE CONDITIONS, ICE
STRENGTH, ICE BREAKING, ICE COVER
THICKNESS, LAKE ICE, FLEXURAL
STRENGTH, VELOCITY, TESTS, MODELS.

STRENGTH, VELOCITY, TESTS, MODELS.
Results of propulsion tests in level icc on a model of the
WTOB 140-ft Creat Lakes icebreaker are presented and
compared to available full-scale data. In spite of the
difficulties in exactly modeling full-scale conditions, the predictions based on the model test results of the ship performance
compared reasonably well to those measured during fullscale trials. Several possible sources of errors are identified.
In particular, duplication at the model scale of the ship
hull's ice friction coefficient is considered to be critical
in determining the ice resistance and the corresponding propulsion characteristics, namely propeller speed, thrust and torque

CR 85-05 NUMERICAL MODELING OF SEA ICE DY-NAMICS AND ICE THICKNESS CHARACTER-ISTICS. A FINAL REPORT. Hibler, W.D., III, Mar. 1985, 50p., ADA-154 600, Refs. p.35-38. 40-3362 ICE MECHANICS TOTAL

ICE MECHANICS, DRIFT, SEA ICB, ICE COVER THICKNESS, ICE EDGE, MATHEMATICAL MODELS, HEAT BALANCE.

A dynamic-thermodynamic sea ice model is extended to include a full thermodynamic code and a complete multilevel ice thickness distribution. The variable thickness formulation includes a more realistic parameterization of ice ridging

than used in previous models. Seasonal simulations have been performed using this model and the results have been analyzed with particular sumphasis of the ridge buildup results off the Canadian Archipelago and off the North Slope. This report presents a complete description of this model and discusses progress made on examining and testing the variable

CR 85-06

KINETIC FRICTION COEFFICIENT OF ICE Forland, K.A., et al, Mar. 1985, 40p., ADA-155 035, 23 refs.

Tatinclaux, J.C. 39-3957

JS-3977 ICE SOLID INTERFACE, ICE FRICTION, ICE HARDNESS, SURFACE ROUGHNESS, ENGI-NEERING, VELOCITY, TESTS.

This study investigates the relative influence of various parameters on the kinetic friction coefficient between ice and different ters on the kinetic friction coefficient between ice and different surfaces. Friction tests were performed with urea-doped, columnar ice, studying the parameters of normal pressure, velocity, type of material roughness, ice orientation, ice hardness and test configuration. Tests were conducted by pulling a sample of ice over a sheet of material and by pulling a sample of material over an ice sheet. An ambient temperature of -1.5 was maintained throughout, and the ice surface hardness was measured using a specially designed. apparatus. The results of the friction tests revealed that the behavior of kinetic friction coefficient with varying velocity was significantly influenced by the test configuration and material roughness. The magnitude of the kinetic friction coefficient was also affected by varying normal pressure, surface roughness and ice hardness. Additional guidelines for standardized ice friction tests and future investigations The results of the friction tests revealed that

CR 85-07

MEASURING THERMAL PERFORMANCE OF BUILDING ENVELOPES: NINE CASE STUD-

Flanders, S.N., Mar. 1985, 36p., ADA-155 083, 13 refs.

THERMAL INSULATION, BUILDINGS, HEAT FLUX, THERMAL MEASUREMENTS, THERMOCOUPLES, COMPUTER APPLICATIONS, COST ANALYSIS, WIND FACTORS.

Nine buildings at Ft. Devens were the object of a study employing heat flux sensors, thermocouples, a computer-controlled data acquisition system and infrared thermography. The purpose was to measure the R-values of those buildings to determine their economic potential for improved insulation. The sample included four frame buildings, two masonry buildings, and three frame buildings with brick facing. The technique for measuring R-values proved repeatable and accurate within 15%. Sampling a small representative sample sufficiently characterizes the entire stock of buildings. Measurement is more important for poorty insulated buildings, since the beginning R-value has a drastic impact on the budget for a cost-effective reinsulation project. At Ft. Devens, installing an external Styrofoam insulation system on concrete block barracks has a savings-to-investment ratio of about 1.4

CR 85-08

ICE FOG AS AN ELECTRO-OPTICAL OBSCU-RANT.

Koh, G., Mar. 1985, 11p., ADA-155 059, 22 refs. 39-3959

ICE FOG, INFRARED RADIATION, LIGHT (VIS IBLE RADIATION), RADIATION ABSORPTION, SCATTERING, ELECTROMAGNETIC PROPERTIES, ICE CRYSTAL OPTICS, ANALYSIS (MATHEMATICS).

(MATIEMATICS).

The extinction of visible light and infrared radiation (at wavelengths of 3.5 and 10.6 micron) by ice fog is considered utilizing theoretical concepts and historical experimental data. The reliability of the spherical approximation of ice for for Mic calculations is examined and judged adequate for forward scatter situations but limited for side and backscatter applications. The relative efficacy in penetrating ice fog as a function of size distribution is evaluated for the wavelengths considered.

CR 85-09

THERMAL CONVECTION IN SNOW.

Powers, D.J., et al, May 1985, 61p., ADA-157 577, Refs. p.46-48.

ck, S.C., O'Neill, K. Colb 40-1009

SNOW THERMAL PROPERTIES, SNOW HEAT FLUX, HEAT TRANSFER, WATER VAPOR, TEMPERATURE GRADIENTS, POROUS MATERIALS, THERMAL CONDUCTIVITY, CONVECTION, MATHEMATICAL MODELS, IATENT HEAT EXPERIMENTATION LATENT HEAT, EX METAMORPHISM (SNOW). EXPERIMENTATION,

METAMORPHISM (SNOW).

Large temperature gradients applied to a snow cover drive water vapor upwards and result in rapid recrystallization of snow crystals. The same temperature gradients create gradients of sir density that can cause flows of sir through the snow cover. The formalism necessary to describe these flows is developed here in an effort to include the convenction of vapor in the understanding of snow metamorphism. The theory of convection through porous media

is extended to include the transport of water vapor, which is important because of its latent heat. Results are presented in terms of a Lewis number, defined as the ratio of thermal in terms of a Lewis number, defined as the ratio of thermal to mass diffusivities. For Lewis numbers greater than 1.0, phase change intensifies convection, and for Lewis numbers less than 1.0, phase change returds convection. Two boundary conditions of special interest in the study of snow, a constant heat flux bottom and a permeable top, are investigated.

CR 85-10 REVIEW OF METHODS FOR GENERATING SYNTHETIC SEISMOGRAMS.

Peck, L., June 1985, 39p., ADA-159 128, Refs. p.36-

40-1367 SOIL MECHANICS, SEISMOLOGY, GEOPHYSI-CAL SURVEYS, WAVE PROPAGATION, COM-PUTER APPLICATIONS, ANALYSIS (MATH-EMATICS).

EMATICS). Various methods of generating synthetic seismograms are reviewed and examples of recent applications of the methods are cited. Body waves, surface waves, and normal modes are considered. The snatytical methods reviewed include geometric ray theory, generalized ray theory (Cagniard-de Hoop method), ssymptotic ray theory, reflectivity method, full wave theory, and hybrid methods combining ray theory and mode theory. Two numerical methods, those of finite differences and finite elements, and a hybrid method combining finite differences with asymptotic ray theory are described. Limitations on the application or validity of the various methods are stated.

CR 25-11

CR 85-11
RECONNAISSANCE OBSERVATIONS OF
LONG-TERM NATURAL VEGETATION RECOVERY IN THE CAPE THOMPSON REGION,
ALASKA, AND ADDITIONS TO THE CHECKL-IST OF FLORA

Everett, K.R., et al, June 1985, 75p., ADA-158 724, Refs. p.44-48.

Murray, B.M., Murray, D.F., Johnson, A.W., Linkins, A.E., Webber, P.J. 40-440

40-440
REVEGETATION, TUNDRA, PERMAFROST, SOIL EROSION, ENVIRONMENTAL PROTECTION, ACTIVE LAYER, VEGETATION, FROST ACTION, CLASSIFICATIONS, LANDFORMS, ENVIRONMENTAL IMPACT.

ENVIRONMENT ALL INFACT.

The diversity of disturbance types, landforms, vegetation and soils, together with the large, well-documented floramakes Cape Thompson an ideal site to study long-term (20-year) environmental adjustments after impact. Mancaused disturbances there between 1958 and 1962 fall into three categories: runways, excavations and off-road vehicle trails. In addition, natural disturbance by frost action creates scars. Reestablished vegetation after 20 years consisted of species found in adjacent undisturbed landscapes.

CR 85-12

ANALYSIS OF RIVER WAVE TYPES. Ferrick, M.G., June 1985, 17p., ADA-158 683, For another source see 39-3098. 20 refs.

40-1050 WATER WAVES, RIVER FLOW, RIVER ICE, DAMS, UNSTEADY FLOW, ICE JAMS, RUNOFF. FRICTION, MATHEMATICAL MODELS.

PRICTION, MATHEMATICAL MODBLS.
In this paper, we consider long-period, shallow-water river waves that are a consequence of unsteady flow. River waves result from hydroelectric power generation or flow control at a dam, the breach of a dam, the formation or release of an ice jam, and rainfall/rumoff processes. The Saint-Venant equations are generally used to describe river waves. Dynamic, gravity, diffusion, and kinematic river waves have been defined, each corresponding to different forms of the momentum equation and each applying to some subset of the overall range of river hydraulic properties and time scales of wave motion. However, the parameter ranges corresponding to each wave description are not well ranges corresponding to each wave description are not well defined, and the transitions between wave types have not been explored. This paper is an investigation into these areas, which are fundamental to river wave modeling. The analyzis is based on the concept that river wave modeling. The analyzis is based on the concept that river wave behavior is determined by the balance between friction and inertia.

CR 85-13 ELECTROMAGNETIC MEASUREMENTS OF MULTI-YEAR SEA ICE USING IMPULSE RA-DAR.

Kovacs, A., et al, Sep. 1985, 26p., ADA-160 737, 11 refs.

Morey, R.M. 40-1544

SEA ICE, ELECTROMAGNETIC PROPERTIES, ICE BOTTOM SURFACE, MARINE GEOLOGY, GEOPHYSICAL SURVEYS, ELECTRICAL RESISTIVITY, BRINES, DIELECTRIC PROPERTIES.

Sounding of multi-year sea ice, using impulse radar operating in the 80- to 500-MHz frequency band, has revealed that the bottom of this ice cannot always be detected. This paper discusses a field program aimed at finding out why this is so, and at determining the electromagnetic (BM) properties of multi-year sea ice. It was found that the

bottom of the ice could not be detected when the ice structure had a high brine content. Because of brine's high conductivity, brine volume dominates the loss mechanism in first-year sea ice, and the same was found true for multi-year ice. A two-phase dielectric mixing formula, used by the authors to describe the EM properties of first-year sea ice, was modified to include the effects of the gas pockets found in the multi-wear sea ice. in the multi-year sea ice.

VEGETATION AND ENVIRONMENTAL GRADIENTS OF THE PRUDHOE BAY REGION.

ALASKA. Walker, D.A., Sep. 1985, 239p., ADA-162 022, Refs. p.122-135. 40-1790

TUNDRA, VEGETATION, TEMPERATURE GRADIENTS, PLANTS (BOTANY), COASTAL TOPOGRAPHIC FEATURES, ICE WEDGES, SNOW DEPTH, TEMPERATURE EFFECTS, LOESS, HUMMOCKS, SOIL WATER, UNITED STATES—ALASKA.

The Prudhoe Bay region is a particularly interesting area of tundra because of its well-defined and steep environmental The Prudhoe Bay region is a particularly interesting area of tundra because of its well-defined and steep environmental gradients, the combination of which has not been described elsewhere in the Arctic. It is a region of wet coastal tundra that has a unique substrate pH gradient, due in part to its coastal location. The prevailing northeast winds distribute locas from the Sagavanirktok River over most of the region. Areas downwind from the river have alkaline undra with a gradient of declining soil pH values away from the river: the northwest portion of the region is not downwind from the river and consequently has acidic tundra. The coastal temperature gradient is among the steepest in the Arctic. Three of Young's (1971) four floristic zones, which are based on the amount of total summer warmth, are present within the region. The effects of the temperature of plants in the flora and the increase of the total number of plants in the flora and the increase of the total number of plants in the flora and the increase of the total number of plants in the flora and the increase of the total number of plants in the flora and the increase of the total number of plants in the flora seem moves inland. The predominantly wet landscape also creates steep vegetation gradients within elevation changes of a few centimeters. Small hummer mocks and higher microsites associated with ice wedge polygon relief may be elevated only 10-25 cm above the level of asturated soils but can support rich mesic tundra plant communities.

TNT, RDX AND HMX EXPLOSIVES IN SOILS AND SEDIMENTS. ANALYSIS TECHNIQUES AND DRYING LOSSES.

Cragin, J.H., et al, Oct. 1985, 11p., 13 refs. Leggett, D.C., Foley, B.T., Schumacher, P.W. 40-3363

EXPLOSIVES, FREEZE DRYING, SOIL POLLU-TION, SEDIMENTS, CHEMICAL ANALYSIS, COUNTERMEASURES, DRYING, ADSORPTION, ABSORPTION, TESTS.

TION, ABSORPTION, TESTS.

A method for the analysis of TNT, RDX and HMX explosives in soils and sediments has been devloped. It consists of methanol extraction followed by reversed-phase high performance liquid chromatography using 10% acetonistile/40% methanol/50% water as the eluant. This method was used to study the effect of various drying techniques upon the recovery of TNT, RDX and HMX from soil and sediment samples contaminated with high (%) and low (microgram/g) levels of these explosives. For highly contaminated samples, complete recovery of TNT and RDX was obtained using freeze drying while air drying at room temperature resulted in greater than 90% recovery for both explosives. Other techniques, such as oven drying at 105C, oven drying at 45C, microwave oven drying, and drying under inflared lamps, all resulted in greater losses, with TNT and RDX recoveries ranging from 76 to 90%. Drying losses were not due to simple volatilization but rather to chemical reaction and/or sorption. For soil and sediment samples containing low levels of TNT, RDX and HMX, recoveries of all three explosives were quantitative for all of the above drying techniques.

MECHANICAL PROPERTIES OF MULTI-YEAR SEA ICE. PHASE 2: TEST RESULTS. Cox, G.F.N., et al, Oct. 1985, 81p., ADA-166 333, 10

refs

Richter-Menge, J.A., Weeks, W.F., Bosworth, H., Perron, N., Mellor, M., Durrell, G. 40-3364

ICE MECHANICS, ICE STRENGTH, SEA ICE, STRAINS, COMPRESSIVE PROPERTIES, ICE PHYSICS, PRESSURE RIDGES, TENSILE PROP-ERTIES, LOADS (FORCES).

This report presents the results of the second phase of a test program designed to obtain a comprehensive understanding of the mechanical properties of multi-year sea ice from the Alaskan Beaufort Sea. In Phase II, 62 constant-strainthe Alaskan Beaufort Sea. In Phase II, 62 constant-strain-rate uniaxial compression tests were performed on horizontal and vertical ice samples from multi-year pressure ridges to examine the effect of sample orientation on ice strength. Also conducted were 36 constant-strain-rate tension tests, 55 conventional triaxial tests and 35 constant-load compression tests on multi-year pressure ridge samples to provide data for developing ice yield criteris and constitutive laws. Data are presented on the strength, failure strain and modulus of multi-year sea ice under different loading conditions. The effects of ice temperature, porosity, structure, strain rate, confining pressure and sample orientation on the mechanical properties of multi-year sea ice are examined.

CR 85-17 FIELD TESTS OF THE KINETIC PRICTION CO-EFFICIENT OF SEA ICE.

Tatinclaux, J.C., et al. Oct. 1985, 20p., ADA-163 170. 4 refs.

Murdey, D. 40-3365

ICE FRICTION, SEA ICE, SURFACE PROPERTIES, STEEL STRUCTURES, SHIPS, ICE CRYSTAL STRUCTURE, PRESSURE, ICE STRENGTH, VELOCITY, TESTS.

This report presents the results of tests of the ice friction coefficient carried out during the May 1984 expedition of the F.S. Polaraters off the coast of Labrador. The test surfaces were Inerts-160-coated steel plates and bare steel plates, hand roughened and sandblasted. The main findings plates, hand roughened and sandblasted. The main findings of the studies were: 1) columnar and granular sea ice showed no significant differences in friction coefficient; 2) for columnar ice, friction coefficient was independent of ice crystal orientation with respect to test surface; 3) friction coefficient was independent of normal pressure applied on ice sample; 4) friction coefficient initially decreased with increasing relative veslocity between the ice sample and the test surface and reached a steady value at higher speeds; 5) friction coefficient increased with increasing surface roughness; 6) a wetting surface exhibited a higher friction coefficient than a non-wetting surface of the same or even higher roughness average.

CR 85-18 SORPTION OF MILITARY EXPLOSIVE CON-TAMINANTS ON BENTONITE DRILLING MUDS.

Leggett, D.C., Nov. 1985, 33p., ADA-163 231, Refs. p.14-16. 40-3366

EXPLOSIVES, DRILLING FLUIDS, MILITARY OPERATION, POLLUTION, MUD, CHEMICAL COMPOSITION, ENVIRONMENTAL PROTECTION, ADSORPTION, ABSORPTION, ANALYSIS (MATHEMATICS).

TION, ADSORPTION, ABSORPTION, ANALYSIS (MATHEMATICS).

Concern over the environmental fate of explosives has brought about development of sensitive analytical methods for measuring them in groundwater. In turn this concern has been extended to validating the sampling procedures for groundwater. This report addresses the potential effects of residual drilling muds on the analysis for explosive contaminants (TNT, DNT, RDX and HMX) in monitoring wells. The approach was to determine sorption isotherms for each contaminant. Sorption appeared to be independent of solids concentration. Linear isotherms were obtained for RDX and HMX over a range of analytic concentration; therefore, a single constant can be used to estimate the amount sorbed when the solution concentration is known. Isotherms for TNT and DNT were not linear, however. Scatchard analysis suggested that the isotherms for these analytes could be resolved into two predominant components a linear component above a certain sorbed quantity and a Langmuir-type component below this quantity. The experimental data were fitted by regression analysis using the appropriate model. The equations developed can be used to predict the sorbed fraction (analytical bias) for any combination of solids and analyte concentration. The amounts of bentonite found in some existing wells do not appear to be sufficient to cause significant bias in analyses for these explosive contaminants.

CONSTITUTIVE RELATIONS FOR A PLANAR, SIMPLE SHEAR FLOW OF ROUGH DISES. Shen, H.H., et al, Dec. 1985, 17p., ADA-163 147, 10 refs.

Hopkins, M.A. 40-3367

SHEAR FLOW, SURFACE ROUGHNESS, FLOW RATE, FRICTION, STRESSES, AVALANCHES, COMPUTER APPLICATIONS, TESTS.

COMPUTER APPLICATIONS, TESTS.

Stresses developed in a rapid, simple shear flow of disks are quantified. Collisional momentum transfer is considered to be the dominant stress generating mechanism. The disks are inelastic and frictional. The restitution coefficient of friction together determine the transfer of momentum and dissipation of energy during a collision. The frictional coefficient generates and maintains a rotational motion of disks. The total fluctuation motion of disks consists of two translational modes and one rotational mode. The rotational mode is found to depend on both the restitution and friction coefficient. Equipartitions of energy among all modes of motion is sheent. The mean rotation, however, depends only on the mean flow gradient. The analysis assumes a constant magnitude for all fluctuation modes. Comparison with a computer simulated disk flow shows good agreement. This implies that the distribution of stresses.

CR 85-21 ICE-CORING AUGERS FOR SHALLOW DEPTH SAMPLING.

Rand, J.H., et al, Dec. 1985, 22p., ADA-166 630, 12

dellor, M. 40-3273

AUGERS, ICE CORING DRILLS, PERMAFROST, FROZEN GROUND, ICE SAMPLING, DRILLING, EQUIPMENT.

ING, EQUIPMENT.

The development of lightweight coring augers for ice is reviewed. Emphasis is on equipment designed by the Cold Regions Research and Engineering Laboratory and its predecessor organizations for sampling to depths less than 20 m or so. Design and operation of the ACFEL/SI-PRE/CRREL 3-in.-ID corer is discussed, and modifications of the basic design for powered operation and for drilling in frozen soil are outlined. Recent replacements for the radditional coring auger are described, and details are given for the construction and operation of the new 4 1/4-in-ID coring equipment. A powered 12-in-ID drill for shallow-depth coring is also described.

CR 85-22

LEVEL ICE REPEAETNIC BY A CYARDY EMPLOYED.

LEVEL ICE BREAKING BY A SIMPLE WEDGE. Tatinclaux, J.C., Dec. 1985, 46p., ADA-166 629, 6 refs.

40-3274 ICE BREAKING, ICEBREAKERS, ICE FLOES, ICE FRICTION, ICE LOADS, LOADS (FORCES), ICE MODELS, ICE PHYSICS, TESTS.

ICE MODBLS, ICE PHYSICS, TESTS.

Tests in level ice on an idealized icebreaker bow in the shape of a simple wedge were conducted in the test basin. The horizontal and vertical forces on the wedge were measured, and fice size distribution in the wake of the wedge was observed. From the force measurements, the ice wedge/hull friction factor was calculated and in general agreement with the friction factor measured in separate friction tests. The ice fice length and ice fice area measured in the current study followed log-normal probability distributions defined by the length average and area average and corresponding standard deviations S(L) and S(A).

CR 86-03

EXPERIMENTAL DETERMINATION OF HEAT TRANSFER COEFFICIENTS IN WATER FLOW-ING OVER A HORIZONTAL ICE SHEET. Lunardini, V.J., et al, June 1986, 81p., ADA-170 427,

32 refs.

Zisson, J.R., Yen, Y.-C. 40-4709

40-4709
HEAT TRANSFER, WATER TEMPERATURE,
WATER FLOW, ICE COVER EFFECT, ICE
MELTING, ICE SURFACE, TESTS, VELOCITY,
COMPUTER APPLICATIONS, TURBULENT FLOW.

FLOW.

Reperiments to study the melting of a horizontal ice sheet with a flow of water above it were conducted in a 35-m-long refrigerated flume, with a cross section of 1.2x1.2 m. Water depth, temperature, and velocity were varied as well as the temperature and initial surface profile of the ice sheet. The heat transfer regimes were found to consist of forced turbulent flow at high Reynolds numbers with a transition to free convection heat transfer. There was no convincing evidence of a forced laminar regime. The data were correlated for each of the regimes, with the Reynolds number, Re, or the Grashof number combined with the Reynolds number.

SPECIAL REPORTS

SR 76-01 CLIMATIC AND SOIL TEMPERATURE OBSER-VATIONS AT ATKASOOK ON THE MEADE RIVER, ALASKA, SUMMER 1975. Haugen, R.K., et al, May 1976, 25p., ADA-025 193,

Brown. J., May, T.A.

22-1197 CLIMATOLOGY, AIR TEMPERATURE, SOIL TEMPERATURE, UNITED STATES—ALASKA—

ATKASOOK.

Au temperatures measured during the summer of 1975 indicated that the Meade River site, 120 km aouth of Barrow, has a distinctly continental summer temperature pattern in comparison to Barrow, which is cooler and has a smaller delly temperature fluctuation. Stepwise multiple regression analysis indicated a significant relationship between current and previous day's air temperature and all of the (near) surface temperatures examined. Precipitation and pan evaporation were not significantly related 'n terrain surface temperatures. At the wet site, the warmest subsurface temperatures were measured in a shallow pond. Dry site temperatures were warmer and showed less variation with depth in comparison to wet site temperatures.

SR 76-02

REGIONALIZED FEASIBILITY STUDY OF COLD WEATHER EARTHWORK.

Roberts, W.S., July 1976, 190p., ADA-029 936, M.S. thesis. 91 refs. 32-1238

COLD WEATHER OPERATION, EARTHWORK, SOIL STRUCTURE, MAPPING, ECONOMIC ANALYSIS.

ANALYSIS.
A regional approach is used to delineate areas in Canada and the United States, in which selected earthwork operations should receive careful consideration for winter execution. Soil texture and soil "form" or physical site environment are deemed important physical factors in the economic feasibility of cold weather earthwork. Summary maps showing significant soil forms and related feasible earthwork operations are presented. A general discussion of the importance of the soil form in the economic feasibility of winter earthwork is included. A summary is presented which shows, with respect to physiographic sections, the salient information and conclusions developed by this study. At least 94% of physiographic sections have two or more winter earthwork operations that are deemed feasible. Only 5 of 213 sections considered do not have any earthwork operations that appear feasible in the winter season.

SR 76-03

THERMOINSULATING MEDIA WITHIN EM-BANKMENTS ON PERENNIALLY FROZEN SOIL

Berg, R.L. May 1976, 161p., ADA-062 447, Ph.D. 120 refs. 32-1239

32-1239
EMBANKMENTS, THERMAL INSULATION,
PERMAPROST PRESERVATION, PROTECTIVE COATINGS, SOIL S EMATICAL MODELS. STABILIZATION, MATH-

EMATICAL MODELS.

Most transportation facilities proposed for arctic and subarctic regions will be constructed on embankments. Incorporation of a thermoinsulating layer within the embankment may permit use of reduced quantities of embankment material. Thermal design and analysis procedures applicable to embankments are reviewed and a two-dimensional numerical method coupling heat and mast transfer and vertical displacement is proposed. The modified Berggrer equation, a method developed by Lachenbruch, and a finite difference technique are used to illustrate design and analysis methods for insulated embankments on permafrost. Most applications of insulation have been in seasonal frost areas but a few test sections have been constructed on permafrost. Stability of thermal and physical properties is a desirable characteristic of thermoinsulating layers. Moisture absorption causes increased thermal conductivity and degradation of strength of some insulating materials. Several types of moisture barriers have been used but the most successful have been polyethylene sheets. SR 76-04

CREEP THEORY FOR A FLOATING ICE

Nevel, D.E., June 1976, 98p., ADA-026 122, 73 refs. 32-1240

FLOATING ICE, ICE CREEP, LOADS (FORCES), STRESSES, ICE MECHANICS, MATHEMATI-CAL MODELS.

The problem investigated is the prediction of the deflection and stresses in a floating ice sheet under loads which act over a long period of time. A review of analytical methods for predicting the bearing capacity of an ice sheet is given. The problem is formulated by assuming the ice is isotropic with a constant Poisson's ratio. The shear modulus is

assumed to obey a linear viscoelastic model. The specific model selected is a series of one Maxwell model and two Voigt models. One of the Voigt models has a negative spring constant which produces tertiary creep. The ice model schibits a primary, secondary, and tertiary creep response, similar to that observed in uniaxial creep tests of ice. The material properties in the viscoelastic model may be a function of the vertical position in the ice sheet, but all these material properties must be proportional to the same function of position. Using the thin-piate theory for the floating ice sheet, the solution is obtained for the deflection and stresses in the ice sheet for primary, secondary, and tertiary creep regions. It is then shown that for a load that is not distributed over a large area, the time-dependent of the load's distribution. For the elastic case, the stress significantly depends upon the load's distribution. Results are given for the deflection and stresses as a function of time and distance from the load. The maximum deflection and stresses occur at the center for the load. At this point the deflection increases with time, while the stresses decrease.

SP 76-05

UTILITY DISTRIBUTION SYSTEMS IN ICE-

Aamot, H.W.C., May 1976, 63p., ADA-026 956.

UTILITIES, WASTE DISPOSAL, SEWAGE DISPOSAL, SUBARCTIC LANDSCAPES, ICELAND. POSAL, SUBARCTIC LANDSCAPES, ICELAND. The study reports on new developments and special problems or solutions in water distribution systems, sewage collection systems, heat distribution and electric transmission system. Cold weather considerations are highlighted. For water and sewage transport, the use of ductile iron, concrete and plastic materials is reported. Utility lines are generally placed individually, utilidors are too expensive for most installations except in some city center locations. Heat distribution with hot water from goothermal wells is mostly one-way piping. After heating, the water is discharged through the sewage system. Street heating is being expanded. With electric distribution, the use of self-supporting aerial cables is becoming popular because it is very cost-effective and reinable. Within the city, all distribution is under ground. Arcing of isolators on high voltage transmission lines due to salt from the ocean atmosphere is being reduced with silicone fluids.

SR 76-06

INFLUENCE OF INSULATION UPON FROST PENETRATION BENEATH PAVEMENTS. Eaton, R.A., et al, May 1976, 41p., ADA-026 957, 10

Dukeshire, D.E.

32-1242

PAVEMENTS, SUBGRADE PREPARATION, FROST HEAVE, FROST PENETRATION, CEL-LULAR MATERIALS, THERMAL INSULATION. LULAR MATERIALS, THERMAL INSULATION. In order to minimize differential frost heaving caused by variable in-situ soil conditions, granular material is placed on top of the frost-susceptible subgrade. This creates a uniform layer to bridge subsurface irregularities in soil properties. This method of protecting the pavement structure can be costly. A method of reducing the amount of granular material is the use of a thermal insulating layer beneath all or part of the base course which prevents freezing temperatures from reaching the non-uniform subgrade. A test road which includes styrofoam board insulated test sections was constructed at CRREL in 1973. A transition section was built between a control section and an insulated section minimize the drastic difference in frost penetration and resultant differential frost heave. Large temperature differences were measured between the insulated 1.3 do onventional sections, frost penetrations were one-third as deep beneath ences were measured between the insulated that conventional sections, frost penetrations were one-third as deep beneath the insulated section, differences in frost heave were negligible, and pavement deflections were approximately the same on the two sections. Surface differential icing did occur between the control and insulated sections.

SKYLAB IMAGERY: APPLICATION TO RESER-VOIR MANAGEMENT IN NEW ENGLAND McKim, H.L., et al, Sep. 1976, 51p., ADA-030 329, 24

Gatto, L.W., Merry, C.J., Haugen, R.K.

32-1243 AERIAL SURVEYS, SPACEBORNE PHOTOGRA-PHY, MAPPING, RESERVOIRS.

THI, MAPPING, RESERVOIRS.

The purpose of this investigation was to determine the utility of Skylab S190A and B photography for providing reservoir management information in New Ragland. LANDSAT, Skylab S190A and S190B and RB-57/RCS images were reduced to a common scale of 1:63,360 for a mapping base to demonstrate the extent to which the imagery could be utilized in the preparation of reconnaissance land use maps. Visual interpretations were accomplished on original NASA

color infrared S190A/B and RB-57/RC8 transparencies and a LANDSAT false color print made in-house. Ancillary data were not used during the mapping exercise to eliminate bias in the comparisons and to ensure that the results were derived strictly from interpretations of tones and textures on the photography. The classification scheme was a modified version of the U.S. Geological Survey Land Use Classification System for use with remote sensor data. The relative utility of the multiband imagery in identifying and quantifying hydrologic factors was evaluated. The land use statistics for two small watershods were determined and the effects of these land use factors were appraised for possible contribution to runoff potential. This appraisal indicated that basin topography and the nature of runoff may be more important factors in predicting volume of runoff from a watershed than land use factors. Companisous of the usefulness of the various imagery systems are made.

SK 75-56 SURVEY OF ROAD CONSTRUCTION AND MAINTENANCE PROBLEMS IN CENTRAL

AT.ARKA. Clark, B.F., et al, Oct. 1976, 36p., ADA-032 085, 21 refs.

Simoni, O.W.

32-1244
ROADS, WINTER MAINTENANCE, ROAD ICING, PERMAPROST PRESERVATION, THERMAL INSULATION, EROSION.

MAL INSULATION, EROSION.

A survey of road construction and maintenance problems in central Alaska is presented. The problems of poor fill and foundation material, permatrost degradation under pavement and shoulders, alope instability, water erosion, road icing from subsurface seepage and culvert icing are described. Possible solutions to road maintenance problems in central Alaska include the use of insulating materials in permatrost areas, MESL construction when non-frost-susceptible soils are unavailable, and the use of improved drainage in areas where extensive icing occurs. Bridge damage, erosion of sidehill cuts and embankment instability are also discussed and potential solutions are given.

SR 76-09 COMPRESSED AIR SEEDING OF SUPER-COOLED FOG.

Hicks, J.R., Oct. 1976, 9p., ADA-040 819, 1 ref. 32-1245

SUPERCOOLED FOG, CLOUD SEEDING, FOG DISPERSAL, ICE CRYSTAL FORMATION.

DISPERSAL, ICB CRYSTAL FORMATION.
Two series of experiments, 25 in a light fog and 25 in a heavy fog, were conducted in the CRREL cold cloud chamber. Compressed air was used to glaciate the 4C fog. The gage air pressure was 413.7 kPa. These tests showed that the number of ice crystals produced exceeded the number of water droplets in the fog by a factor of 21 for a light fog and 133 for a heavy fog. Approximately 2.6 times as many ice crystals were created in a heavy fog than were created in a light fog.

SR 76-10 TEMPORARY ENVIRONMENT. COLD RE-

GIONS HABITABILITY. Bechtel, R.B., et al, Oct. 1976, 162p., ADA-032 353, Bibliography p. 115-116. Ledbetter, C.B.

32-1246

IRONMENTS, HUMAN FACTORS ENGI-NEERING, BUILDINGS.

NEBRING, BUILDINGS.

After classifying government environments in Alaaka and studying four Federal Aviation Administration (FAA) and three Aircraft Control and Warning (Ac&W) stations (in Phases 1 and 2), a cold regions environmental psychology behavior setting survey was made of Fort Wainwright, Alaaka, to complete Phase 3. Phase 4 analyzed Fort Wainwright, Alaaka, to complete Phase 3. Phase 4 analyzed Fort Wainwright data and compared it with the FAA and Ac&W data and previous studies. The military locations could be characterized as temporary environments. The military environment in fiftered from civilian environments in the behavioral areas of religion, government and professionalism. FAA stations were found to have the richest environment and Ac&W stations the most deprived. Yet Ac&W stations compensated by providing greater leadership opportunities. Small installations had an advantage over large installations in the participation level of their populations in recreational and other activities. Pamily housing, transient housing, barracks and work environments of Fort Wainwright were studied. Habitability guidelines were suggested for minimal renovation, major renovation and new construction of these kinds of buildings. An overall plan for a more habitable location of poet facilities was suggested. The behavior setting survey technique in shortened form proved useful in this study. Suggestions for future research in testing habitability guidelines were made.

SR 76-11 OBSERVATIONS ALONG THE PIPELINE HAUL ROAD BETWEEN LIVENGOOD AND THE YUKON RIVER.

Berg, R.L., et al, Oct. 1976, 73p., ADA-033 380, 7 refs. Smith. N. 32-1247

ROADS, SLOPE STABILITY, GROUND ICE, VEGETATION.

VEGETATION.

Periodic observations over a six-year period along the TAPS Road have been evaluated with respect to construction and slope stabilization techniques in ice-rich roadway cuts and embankment subgrades. Lateral drainage ditches of sufficient width to handle construction excavation equipment, along with near-vertical slope cuts with hand-cleared tops equal in width to one and one-half times the height of the cuts, significantly enhance natural processes of slope stabilization. Right-of-way clearing limited to the toe of embankment fill slopes minimizes subsidence of the roadway and its shoulder slopes. In extremely ice-rich soil cuts, the seeding of the slopes ahould not be attempted until late in the first thaw season for best results. Natural late in the first thaw season for best results. Natural swoody growth can be expected to have a substantial stabilizing effect after five or six thaw seasons but could be accomplished sooner by planting tree seedlings. Attempts to stabilize ice-rich cut slopes with applications of insulation are not very effective and seem to prolong the natural stabilization process.

SR 76-12

OPERATIONAL REPORT: 1976 USACRREL-USGS SUBSEA PERMAFROST PROGRAM BEAUFORT SEA, ALASKA.

Sellmann, P.V., et al, Oct. 1976, 20p., ADA-032 440,

Lewellen, R.I., Ueda, H.T., Chamberlain, E.J., Blouin, 32-1248

OFFSHORE DRILLING, LOGISTICS, SEA ICE, SUBSEA PERMAFROST.

SUBSEA PERMAPROST.

During the spring of 1976, three holes were drilled offshore in the Prudhoe Bay area using the sea ice cover as a drilling platform. The objectives of this program were to obtain samples and subsurface information to aid in quantification of the engineering characteristics of permafrost benesth the Beaufort Sea as well as to conduct supporting thermal and geological studies. The results of the drilling and related investigations are being used in conjunction with data from other subsex permafrost projects to develop maps and models for the prediction of permafrost occurrence in this offshore environment. The project also provides a means of testing drilling, sampling, and in-situ measurement techniques in an offshore setting where material types and sea ice conditions make acquisition of undisturbed samples extremely difficuit. This report documents the operational aspects of the spring 1976 field study; subsequent reports will cover the technical and research results.

ENVIRONMENTAL ANALYSES IN THE KOOTENAI RIVER REGION, MONTANA. McKim, H.L., et al, Nov. 1976, 53p., ADA-033 500,

Gatto, L.W., Merry, C.J., Brockett, B.E., Bilello, M.A., Hobbie, J.E., Brown, J. 32-1255

J2-1233 CLIMATOLOGY, RESERVOIRS, ICE COVER, LIMNOLOGY, SPACEBORNE PHOTOGRAPHY, UNITED STATES—MONTANA—KOOTENAI

UNITED STATES—MONTANA—KOOTENAI RIVER.

The purpose of this investigation was: 1) to compile and analyze climatic data for the past 10 years from all available weather observing stations in the East Kootenai River Basin, 2) to analyze changes in ice and anow cover, and turbidity and plankton blooms on Lake Koocanusa, 3) to assess the present limnology of Lake Koocanusa and the potential for water quality problems, especially eutrophication, and 4) to demonstrate the reliability of the LANDSAT Data Collection Platform (DCP)-Martek Water Quality Monitor system for sequisition of data from a remote site. Results of the investigations indicate that the Kootenai region is about twice as cold as the Libby region in winter, and that reservoir ce first forms along the shore in the northern region in late November and in the southern part in mid-December, with total freeze-over usually occurring 2 to 4 weeks later. Ice break-up in the northern sections usually occurs 1-3 weeks later than in southern areas; average annual snowfall is 42 to 144 in., with ice thickness and snowfall varying with relief. Variations in areal distribution of snow within the basin and ice cover on the reservoir were observable for periods from January to October 1973, and reservoir furbidity was observed to increase south of Elisworth and Stenerson Mountains. Low algal productivity observed was due to the algae being circulated most of the time below the depth of 1% light and due to high turbidity. The DCP-Marrek system operated well and reliable data were received while the system was located in the pool above Libby Dam and downstream below the dam. Brief interruptions in data transmissions occurred in April, when the Martek sensor showed a few minor inconsistencies, but the system demonstrated the feasibility of this technique for data acquisition from remote sites.

SR 76-14 NOTES ON CONDUCTING THE BEHAVIOR SETTING SURVEY BY INTERVIEW METHOD. Ledbetter, C.B., Nov. 1976, 33p., ADA-062 448, 17

32-1256

ENVIRONMENTS, HUMAN FACTORS, MILITARY FACILITIES.

Practical guidelines for conducting the behavior setting survey by interview method are presented. This training manual for the layperson describes the data, survey forms and interview

PATE AND EFFECTS OF CRUDE OIL SPILLED ON PERMAFROST TERRAIN. FIRST YEAR PROGRESS REPORT.

Collins, C.M., et al, Nov. 1976, 18p., ADA-034 140,

Deneke, F.J., Jenkins, T.F., Johnson, L.A., McFadden, T., Slaughter, C.W., Sparrow, E.B. 32-1257

OIL SPILLS, SOIL TEMPERATURE, VEGETA-TION, PERMAFROST.

TION, PERMAFROST.

The long-term effects and ultimate fate of crude oil spilled on permafrost-underlain tundra is the subject of this study. The project involves two experimental oil spills of 2,000 gallons (7,570 liters) each on 500 sq m test plots near Fairbanks, Alaska. A winter spill, discussed in this progress report, took place in February 1976. Another spill will take place at the peak of the growing season in the summer. This allows conditions prevailing during these climatic periods to be studied as to their effect on oil spills, and makes it possible to study the reaction of the spilled oil to these temperature extremes. The spill discussed in this report was designed to simulate a real pipeline leak, and was large enough to approach reality while remaining within the limits of logistical capabilities. Monitoring of the spill and control lots includes: oil movement, temperature regime, biological effects, microbiological changes, permafrost impact, and chemical degradation of the oil.

UTILITY DISTRIBUTION SYSTEMS IN SWEDEN, FINLAND, NORWAY AND ENGLAND.

Aamot, H.W.C., et al, Nov. 1976, 121p., ADA-035
088, Bibliography p.116-121.

McFadden, T.

UTILITIES, SEWAGE DISPOSAL, ELECTRICITY, HEATING, WATER SUPPLY, SCANDINAVIA, UNITED KINGDOM.

The study reports on new developments and special problems or solutions in water distribution systems, sewage and solid waste transport systems, heat distribution systems and electric transmission systems. Cold weather considerations are highlighted. For water and sewage systems, the use of ductile iron and plastic materials for pipes is reported. The use of heating, insulating or shielding of the pipes for frost protection is of interest. Some developments in tunneling technology were identified. Pneumatic solid waste collection and vacuum sewage collection represent new developments. For heat distribution, the many different types of pipe and insulation systems used are described. Good moisture control in insulation is emphasized. Developments in long distance heat transmission are discussed. With electric distribution, the use of self-supporting serial cables is a new development. With transmission, problems of icing and countermeasures are discussed. Cold weather considerations are ssion systems.

ENERGY CONSERVATION IN BUILDINGS. Ledbetter, C.B., Dec. 1976, 8p., ADA-034 141, 3 refs.

HEATING, BUILDINGS, CONSERVATION.

This report scans current building designs and describes, for the layman, ways that buildings could be designed for improved energy consumption. Topics of building design addressed are insulation, thermal bridges, ventilation, orientation, lighting, windows, and solar heat.

IMPROVED MILLIVOLT-TEMPERATURE CONVERSION TABLES FOR COPPER CON-STANTAN THERMOCOUPLES. 32F REFER-ENCE TEMPERATURE,

Stallman, P.E., et al, Dec. 1976, 66p., ADA-034 841, 6 refs.

Itagaki, K.

32-1260 TEMPERATURE MEASUREMENT, CONVER-SION TABLES.

SION TABLES.

This report extends and improves the conversion tables already available (CRREL Special Report 108, G.W. Aitken, 1966, 24-3490 (AD-805 751)). The computational method is described with discussion of error, improved methods, and limitations. The tables are presented in two sections: the first for temperatures in the range -184C to OC, the second for temperatures in the range OC to 100C. The corresponding Pahrenheit temperatures are also included.

SR 77-01

SELECTED EXAMPLES OF RADIOHM RESISTIVITY SURVEYS FOR GEOTECHNICAL EX-PLOBATION.

Hoekstra, P., et al, Jan. 1977, 16p., ADA-035 761, 20

Sellmann, P.V., Delaney, A.J.

GEOPHYSICAL SURVEYS, ELECTRICAL RESIS-TIVITY, PERMAPROST INDICATORS, GRAV-

Measurements of ground resistivity using radio wave techniques have been made in support of several geotechnical projects. Examples of surveys conducted for locating and evaluating gravel deposits, for delineating permafrest, and for extrapolating subsurface information between drill holes are used to illustrate some advantages of ground and airborne surveys using this method.

CREEL ROOF MOISTURE SURVEY, PEASE AFB BUILDINGS 33, 116, 122 AND 205. Korhonen, C., et al, Jan. 1977, 10p., ADA-035 762. Tobiasson, W., Dudley, T.

32-1276 ROOFS, MOISTURE, INSULATION, INFRARED

EQUIPMENT.

EQUIPMENT:

Four building roofs at Pease AFB were surveyed with a hand-held infrared camera to detect wet insulation. Areas of wet insulation on these roofs were marked with spray paint, and 3-in-diam core samples of the built-up membrane and insulation were taken to verify wet and dry conditions. Flashing defects are considered responsible for most of the wet insulation uncovered in this survey. Recommendations for maintenance, repair, and replacement were developed from the infrared surveys, core samples and visual examinations.

SR 77-03

ESTIMATING HEATING REQUIREMENTS FOR BUILDINGS UNDER CONSTRUCTION IN COLD REGIONS—AN INTERACTIVE COM-PUTER APPROACH.

Bennett, F.L., Feb. 1977, 113p., ADA-035 709, 65 refa 32-1277

COLD WEATHER CONSTRUCTION, BUILD-INGS, HEATING, HEAT LOSS, COMPUTER PROGRAMS.

PROGRAMS.

The paper documents a review of construction literature to find reports of projects constructed under low-temperature conditions.

A survey of Alaskan contractors to determine "cutoff temperatures" and other factors that cause suspension of various construction works is also presented. For both the literature search and the contractor survey, the lowest temperature mentioned was -70P.

The paper also describes a computer program for estimating heat loss and enclosures and heating costs for buildings under construction in cold regions. The program is described, a sample program rm is presented, and a successful velidation effort is surmarized.

SR 77-04

HAINES-FAIRBANKS PIPELINE: DESIGN, CONSTRUCTION AND OPERATION.
Garfield, D.E., et al, Feb. 1977, 20p., ADA-038 445,

Ashline, C.B., Haynes, F.D., Ueda, H.T.

32-1278

32-1278
PIPELINES, MAINTENANCE, CONSTRUCTION, UNITED STATES—ALASKA.
This report is intended to provide a background for the analysis and evaluation of new pipelines being built in cold regions. Topics discussed include the initial design, construction, testing, operation and maintenance of, and modifications to the 8-in. pipeline from the deep water port of Haines to military installations at Fairbanks, Alaska. The 626-mile multi-product pipeline began operation in 1956. The results of a corrosion survey completed in 1970 indicated that extensive renovation would be required to continue operations, and the section from Haines to Eielson Air Force Base was closed in 1973.

SR 77-05

GUIDELINES FOR ARCHITECTURAL PRO-GRAMMING OF OFFICE SETTINGS. Ledbetter, C.B., Mar. 1977, 14p., ADA-037 124, 2

32-1279

ENVIRONMENTAL TESTS, HUMAN FACTORS ENGINEERING, BUILDINGS.

ENGINEERING, BUILDINGS.

A demonstration of Barker's K-21 test for identifying and differentiating behavior settings is presented as a means of diagnosing problems in an office environment. For didelines for rearranging the layout of an organization's offices are developed that could also be used for architectural programming for a new building if the organization were to be relocated. As an instructional program, the demonstration presented here shown how to conduct the K-21 test in order to analyze problems concerning behavior setting boundaries or conflicts between behavior settings.

SYMPOSIUM: GEOGRAPHY OF POLAR COUNTRIES; SELECTED PAPERS AND SUM-

Brown, J., ed, Mar. 1977, 61p., ADA-038 379, In English and Russian. Numerous refs. For selected papers see 32-1302 through 32-1306. 32-1301

LAND DEVELOPMENT, ENVI-RONMENTAL PROTECTION.

The symposium on Geography of Polar Countries held in Leningrad 22-26 July 1976 as part of the XXIII International Geographical Congress consisted of three seasions: (1) Polar environment, natural resources, their exploration and exploitation; (2) Past, present and future economic developments in the polar regions; (3) Polar environment protection. This report presents the full test or extended summaries of anumber of the U.S. pepers, and English and Russian summaries of the Soviet contributions related to environmental protection. of the Soviet contributions related to environmental protection. The papers and summaries presented in this report reflect the participation of members and of the joint US-USSR environmental protection agreement project, Protection of Northern Boosystema.

The U.S. papers deal with land use planning to mitigate environmental impact: the impact of resource development on natives, fish and wildlife, and permafrost, the impacts of pipelines and roads on the environment, and computer modeling to simulate terrain modification due to man's activities. The Soviet summaries deal with subjects of properties and changes in arctic and subarctic flora, treeline, and permafrost, and methods of predicting changes in the environment.

SR 77-07

SELECTED BIBLIOGRAPHY OF DISTURB-ANCE AND RESTORATION OF SOILS AND VEGETATION IN PERMAPROST REGIONS OF THE USSR (1970-1976).

Andrews, M., Mar. 1977, 116p., ADA-051 813.

32-2728
BIBLIOGRAPHIES, CRYOGENIC SOILS,
REVEGETATION, LAND RECLAMATION.
The literature is discussed in chronological fashion, with
general statements followed by highlights of each year's contributions (with three tables and two appendices for amplifications). The years 1972 and 1973 produced the most publications, and by 1975 there was a noticeable lag in pickup
of publications by the indexing services. A trend is apparent
from a recommaissance and description approach in more
recent publications. Increased consciousness of the effects
of disturbance on the permafront environment, and the improrecent publications. Increased constitutions to the effects of disturbance on the permafrost environment, and the importance of restoration and preservation of these environments, are reflected in the recent literature, particularly in symposium

ST 77-02

SK //-05
REVEGETATION AND EROSION CONTROL
OBSERVATIONS ALONG THE TRANS-ALASKA
PIPELINE—1975 SUMMER CONSTRUCTION

Johnson, L.A., et al, Mar. 1977, 36p., ADA-038 416. Quinn, W.F., Brown, J. 32-1311

PIPELINES. SOIL EROSION, EROSION CON-TROL, PROTECTIVE VEGETATION.

Procedures for revegetation and erosion control of the Trans-Alaska Pipeline System during the initial construction phase Alsaka Pipeline System during the initial construction phase are reviewed. Fertülizer and seed rates and schedules of application by major areas (sections) are presented. During the field season of 1975 CRREL personnel observed revegetation and erosion control practices along the entire length of the pipeline route. The types of problems and early successes are discussed. Thirty-eight photographs are presented of characteristic areas on which revegetation was initiated. A list of sites for follow up observations in presented.

SR 77-09

INFRARED THERMOGRAPHY OF BUILD-INGS: AN ANNOTATED BIBLIOGRAPHY. Marshall, S.J., Mar. 1977, 21p., ADA-038 447, 42 refs.

BIBLIOGRAPHIES, BUILDINGS, T. ANALYSIS, INFRARED RADIATION.

ANALYSIS, INFRARED RADIATION.
This report summarizes a review of the current literature on the new subject of infrared thermography of buildings. Infrared thermography of buildings. Infrared thermography of buildings. Infrared thermography of buildings. Infrared thermography of buildings of the same to detect heat loss, structural defects, moisture, and other anomalies in building envelopes. Photographs of the imagery called thermograms provide hard copy documentation of faults detected. Thirty-four references are abstracted, covering research and development, roof moisture surveys, and qualitative/quantitative field surveys. The resetly obtainable sources were chosen for their practical approach to providing potential users who are not scientifically oriented with an opportunity to quickly grasp the value of this new technology.

SR 77-10

COMPUTER ROUTING OF UNSATURATED FLOW THROUGH SNOW.

Tucker, W.B., et al, May 1977, 44p., ADA-040 121. Colbeck, S.C. 32-1313

SNOW COVER, WATER FLOW, SNOWMELT, COMPUTER PROGRAMS.

COMPUTER PROGRAMS.

Computer programs for routing the vertical movement of water through snow have been developed. The shock front is dependent on surface melt taking place now as well as the antecedent flow in the snow, usually a function of the nature of the flow for the previous day. One program, designed to accommodate actual surface melt data, has the shilly to handle complicated input profiles such as when melt is erratic on a cloudy day, creating such complexities as intersecting shock fronts. Another program, designed for rapid simulation purposes, approximates a simple surface input with a function, in this case a sine wave. This function is easily changed, sllowing a variety of conditions to be assessed, although only one shock front is accommodated. Error analysis and some applications of the programs are presented.

DEMONSTRATION OF BUILDING HEATING WITH A HEAT PUMP USING THERMAL EF-

Sector, P.W., May 1977, 24p., ADA-041 024, 13 refs. 32-1314

32-1314
HEAT RECOVERY, HEATING, BUILDINGS, COST ANALYSIS, HEAT PUMPS.
This report describes efforts made to recover waste heat and to reuse it to heat a building. A heat pump, which is a refrigeration device, was operated to provide building heat and to demonstrate both economic benefits and energy savings possible with this type of heating system. Heat pump fundamentals and system design considerations supplement the report of this demonstration project. Operational characteristics were monitored and are reported. A 25% reduction in heating costs was observed compared with an oil-fired system. The author recommends that the minimum coefficient of performance should be 3.4 for a cost effective, energy-conservative heat pump heating system.

SR 77-12 LABORATORY STUDIES OF COMPRESSED AIR SEEDING OF SUPERCOOLED FOG. Hicks, J.R., et al, May 1977, 19p., ADA-040 633, 3

Rice, R.C., Jr. 32-1315

SUPERCOOLED SUPERCOOLED FOG, CLOUD SEEDING, LABORATORY TECHNIQUES.

Some 400 tests were conducted in the CRREL cold cloud chamber to determine the combination of air pressure nozzle design that yielded the maximum production of ice crystals in a supercooled fog. It was found that some 0.22 cu m/min of sir which was compressed to 517 kPa is needed to be effective for clearing a supercooled fog.

STAKE DRIVING TOOLS: A PRELIMINARY SURVEY.

Kovacs, A., et al, May 1977, 43p., ADA-041 053, 9

Atkins, R.T.

32-1316 ANCHORS, FROZEN GROUND, DRILLS, PILE DRIVING, HAMMERS.

DRIVING, HAMMERS.

This report gives results of a study of four commercial breaker-rock drills, a prototype hydraulic stake driver-retriever and a prototype propellant-actuated hammer which were evaluated for driving anchors into hard frozen ground. The tests found that commercial breaker-rock drills can be used without modification to drive standard military GP-112/G and GP-113/G stakes into frozen ground. The study revealed that while the hydraulic stake driver would require further development to increase in reliability, it could drive the above stakes into frozen ground. The propellant-actuated stake driver was found incapable of driving stakes into hard frozen ground and was not considered worthy of further development as a stake driver.

SR 77-14

RUNWAY SITE SURVEY, PENSACOLA MOUN-TAINS, ANTARCTICA.

Kovacs, A., et al, June 1977, 45p., ADA-051 814, 6 cefe

Abele, G.

SITE SURVEYS, AIRCRAFT LANDING AREAS. ICE RUNWAYS, ANTARCTICA—PENSACOLA MOUNTAINS.

Two blue ice areas were surveyed in the Pensacola Mountain region of Antarctica and found suitable for runway sites. A length of 2.5 to 3 km, oriented in the predominant wind direction, is available at Roseer Ridge, requiring very little snow removal. A length of 3 km, oriented at 30 deg to 45 deg with the predominant wind direction, is available at Mt. Lechner, but considerable snow removal would be required, and some obstacles are present near

both ends of the runway area. Aerial inspection disclosed one and probably two more suitable sites near the Patuzent Range.

SR 77-15

SK 1/-13

ROLYMA WATER BALANCE STATION, MAGA-DAN OBLAST, NORTHEAST U.S.S.R.: UNITED STATES-SOVIET SCIENTIFIC EXCHANGE VISIT.

Slaughter, C.W., et al, May 1977, 66p., ADA-041 606, 16 refs. For a shorter version see Arctic bulletin, 1978, 2(13), p.305-313. 16 refs.

Bilello, M.A. 32-1318

WATER BALANCE, STATIONS, RESEARCH PROJECTS, INTERNATIONAL COOPERATION, USSR-MAGADAN.

USSR—MAGADAN.

Two U.S. scientists visited Kolyma Water Balance Station (KWBS) in Magadan Oblast of northeast USSR during the last two weeks of August 1976. Under the auspices of the Joint USA-USSR Agreement on Cooperation in the Field of Environmental Protection, this trip was undertaken to review current Soviet watershed hydrology research in a permafrost dominated setting similar to that of central Alaska. Research objectives, instrumentation, and field practices were observed and discussed at KWBS. A series of proposals for future cooperation in high latitude hydrology research and data exchange was prepared.

SR 77-16

COMPOSITION OF VAPORS EVOLVED FROM MILITARY THT AS INFLUENCED BY TEM-PERATURE, SOLID COMPOSITION, AGE AND SOURCE

Leggett, D.C., et al, June 1977, 25p., ADA-040 632,

Jenkins, T.F., Murrmann, R.P. 32-1319

EXPLOSIVES, IMPURITIES, VAPOR PRESSURE,

EXPLOSIVES, IMPURITIES, VAPOR PRESSURE, CHEMICAL ANALYSIS.

A number of domestic and foreign military TNT samples were analyzed by a gas chromatographic headspace technique. The method allowed the determination of the vapor pressure of TNT and the partial pressures of several associated impurities over a 2 to 32C temperature range. A major volatile impurity in all U.S. military TNT samples was 2,4-dinitrotoluene, which had a partial pressure 1 to 2 orders of magnitude higher than the vapor pressure of TNT. The experimental data followed a Clausius-Clapeyron temperature dependence for the vapor pressure of TNT, and the partial pressure of DNT was related to its concentration in the solid by a Henry's constant. Age and source of the TNT were found to have little or no influence on these relationships. The reasons for finding a relatively high DNT partial pressure are discussed, as is its implication for TNT detection by trace gas methods.

SR 77-17

OF LOW-PRESSURE WHEELED EFFECTS VEHICLES ON PLANT COMMUNITIES AND SOILS AT PRUDHOE BAY, ALASKA.
Walker, D.A., et al, June 1977, 49p., ADA-041 593, 11

Webber, P.J., Everett, K.R., Brown, J. 32-1320

TUNDRA TERRAIN, DAMAGE, ALL TERRAIN VEHICLES, TIRES, TUNDRA VEGETATION, UNITED STATES—ALASKA—PRUDHOE BAY.

UNITED STATES—ALASKA—PRUDHUE BAY.
An off-road vehicle test utilizing a smooth tred Rolligon weighing approximately 25,000 lb. was conducted at Prudhoe Bay, Alaska, on 25 June 1976. Vehicle impact on the vegetation and terrain was documented at 32 stations selected as representative of the coastal tundra terrain. Twenty-seven stations were of single pass rack and five were multiple pass lanes of up to 30 passes. The report documents the impacts with photographs and aumerical ratings. Puture observations will enable determination of rates of recovery.

SR 77-18

INSTALLATION OF LOOSE-LAID INVERTED ROOF SYSTEM AT FORT WAINWRIGHT, ALASKA.

Schaefer, D., June 1977, 27p., ADA-041 574, 11 refs. 32-1321

ROOFS, INSULATION, COST ANALYSIS.

In the summer 1971 the Corps of Engineers replaced the roof on Building 1053 at Ft. Wainwright, Alaska, with a loose-laid inverted roof system. This roof system was selected to permit an evaluation of its performance and potential suitability for general use in Corps construction. The installation of the roof also permitted an analysis of its construction costs and a record of the construction procedures. Costs were identified in terms of costs of the its construction costs and a record of the construction procedures. Costs were identified in terms of costs of the materials used and the number of man-hours required. For the analysis, the job was broken down into four phases:
1) removal of the existing roofing material and preparation of the deck; 2) application of a surface of plywood decking;
3) placement of the butyl membrane and installation of flashings; and 4) placement of the insulation and bellast pavers. The results show that the installation time requirements commerce favorable with these of conventional built. ments compare favorably with those of conventional built-up roofs but the butyl membrane and the pavers cause higher material costs. Advantages are in the maintainability of the roof system and in its increased life expectancy.

SR 77-19

SK 17-17
RECLAMATION OF ACIDIC DREDGE SOILS
WITH SEWAGE SLUDGE AND LIME AT THE
CHESAPEAKE AND DELAWARE CANAL.

Palazzo, A.J., June 1977, 24p., ADA-041 636, Bibliography p.22-24. 32-1322

SOIL ANALYSIS, SOIL CHEMISTRY, SLUDGES. PLANTS (BOTANY), VEGETATION.

PLANTS (BOTANY), VEGETATION.

A field study was conducted to assess the effects of sewage studge and lime on the revegetation and reclamation of acidic (pH 3.0) and infertile dredge soils. Sewage studge at 100 metric tons/ha metric study has and lime at 25 metric tons/ha were applied during the summer of 1974 on a seven hectare site and plowed into the soil to a depth of 20 cm. Soils were sampled 20 months after studge incorporation at three depths, 0-20, 20-40, and 40-50 cm within the studged and control areas. A total of 29 grass treatments, containing grasses seeded alone or in combinations, were also evaluated and screen grass types analyzed for mineral composition. Comparisons between the studged and control areas in the layers from 0-20 cm and below 20 cm were made in terms of changes in soil and plant chemistry, plant utilization of soil minerals, plant adaptability and vigor, and eventual resulting vegetative cover. resulting vegetative cover

SR 77-20

UNCONFINED COMPRESSION TESTS ON SNOW: A COMPARATIVE STUDY. Kovacs, A., et al, July 1977, 27p., ADA-062 445, 21

refs.

Michitti, F., Kalafut, J. 32-4357

SNOW COMPRESSION, COMPRESSIVE STRENGTH, TESTS.

STRENGTH, TESTS.

Results of unconfined compression tests performed on snow from Camp Century, Greenland, using a new self-aligning platen system are compared with tests using a more conventional platen system. The average unconfined compressive test strength was 42% higher for samples tested on the new platen system provides for better sample alignment and therefore a more uniform load distribution applied to the ends of the sample. The higher strength values obtained with the new platen system are considered more representative of the unconfined compressive strength of the snow tested.

SP 77-21 INVESTIGATION OF SLUMPING FAILURE IN AN EARTH DAM ABUTMENT AT KOTZEBUE. AT.ASKA

Collins, C.M., et al, July 1977, 21p., ADA-042 306, 5 refs

McFadden, T.

RESERVOIRS, EARTH DAMS, FROZEN GROUND TEMPERATURE, SETTLEMENT (STRUCTURAL), SUBSIDENCE.

A slumping failure on the upstream side in one area of the water supply reservoir at Kotzebue, Alaska, was investigat-ed. Seven 80-ft (24.4-m) thermocouple strings were em-placed in the dam shutment, and an additional four thermocouple strings were installed behind the dam, extending to a depth of 95 ft (28.9 m) below the bottom of the reservoir. All thermocouples indicated below freezing temperatures at All thermocouples indicated below irecams temperatures at their respective positions. These measurements combined with the drill logs indicate that neither the dam nor the abutment is in immediate danger of failure, but that steps must be taken to stop the abutment area. Recommendations are given to accomplish

SR 77-22

LOCK WALL DEICING STUDIES.

Hanamoto, B., ed, Aug. 1977, 68p., ADA-044 943, For individual papers see 32-1350 through 32-1352, 31-1800, and 32-1109.

32-1349
ICE REMOVAL, CHANNELS (WATERWAYS),
LOCKS (WATERWAYS).
Pour methods for removing the ice buildup on navigation
lock walls on the Poc Locks at Sault Ste. Marie, Michigan,
were investigated: mechanical pneumatic boots, high-pressure
water jets, mechanical chain saws, and chemical coatings.
Two of the more promising means of ice removal, the chain
saw and the chemical coatings, are being developed further
so that they may be used as operational sids for lock wall
descing during the winter navigation season.

SR 77-23

ABNORMAL INTERNAL FRICTION PEAKS IN SINGLE-CRYSTAL ICE.

Stallman, P.E., et al, Aug. 1977, 15p., ADA-045 412, refa

Itagaki, K. 32-1355

CUBIC ICE, ICE PHYSICS, ICE CRYSTAL STRUCTURE, TEMPERATURE EFFECTS, ICE

A series of sharp skewed internal friction peaks were observed during warming of single-crystal ice after cooling below - 120C (133K), the -ubic-hexagonal transition temperature. The peaks were higher when the strain amplitude was lower.

Since handling and annealing strongly affect the occurrence of the skewed peaks, those peaks are probably related to the stacking fault process in hexagonal-cubic transition. SR 77-24

BRAZIL TENSILE STRENGTH TESTS ON SEA ICE: A DATA REPORT.

Kovaca, A., et al, Aug. 1977, 39p., ADA-044 941, 6

Kalafut, J. 32-1356

SEA ICE, IMPACT STRENGTH, PENETRATION TESTS.

In March 1970 drop penetrometer tests in sea ice were made by Sandia Laboratories for the U.S. Coast Guard. In support of this study, properties of the sea ice penetrated were measured. The data collected included ice temperature, salinity, brine volume, density and Brazil tensile strength versus depth. The data are presented in this report in both tables and graphs as a permanent data source.

SP 77-25 SOLVING PROBLEMS OF ICE-BLOCKED DRAINAGE FACILITIES. Carey, K.L., Aug. 1977, 17p., ADA-044 994, 4 refs. 32-1357

32-1357 SURFACE DRAINAGE, ICE CONTROL, HEAT-ING, SUBSURFACE DRAINAGE.

ING, SUBSURFACE DRAINAGE.

The report summarizes several processes for ice formation and blockage in culverts, ditches, and subsurface drains. Solutions to ice blockage problems involve ice prevention and ice control, usually the latter. In some cases, culverts can be closed, leading to intentional ponding and storage of ice. Alternatively, flow can be maintained in culverts by heating them electrically, with steam, or with oil-burner heaters. Ditches can also be heated, but it is usually more effective to widen them to provide more storage space for ice, or to install insulating covers. Subsurface drain outlets can be heated, protected with insulating covers, or partially blocked to prevent cold air entry. Ground seepage that forms ice is successfully controlled using ice fences. Design changes, such as more and larger drainage structures, staggered culverts, and channel modifications, are discussed. SER 77-26

SR 77-26 INFRARED THERMOGRAPHY OF BUILD-INGS: QUALITATIVE ANALYSIS OF FIVE BUILDINGS AT RICKENBACKER AIR FORCE

BASE, COLUMBUS, OHIO.
Munis, R.H., et al, Sep. 1977, 21p., ADA-067 161. Marshall, S.J.

32-4358 HEAT LOSS, INFRARED PHOTOGRAPHY, BUILDINGS, THERMAL ANALYSIS, THERMAL MEASUREMENTS.

MEASUREMENTS.

A beat loss survey was performed on five typical Air Force Base buildings with an infrared camera system: two with wood frames and wood clapboards, one with wood frame and aluminum siding, and two of cinder block construction with brick veneer. This report presents thermograms typical of the heat loss problems in each of the five buildings along with a complete explanation of each thermogram. The report is intended to serve as a basis upon which Air Force civil engineers can plan a future retrofit program for the buildings surveyed and write a set of specifications incorporating thermography.

SEP 77.27

SR 77-27 ICING ON SHIPS AND STATIONARY STRUC-TURES UNDER MARITIME CONDITIONS—A PRELIMINARY LITERATURE SURVEY OF JAPANESE SOURCES.

Itagaki, K., Sep. 1977, 22p., ADA-044 792, 8 refs. 32-1358

SHIP ICING, ICE ACCRETION, ICE FORECAST-ING, TEMPERATURE EFFECTS, SEA SPRAY.

This report reviews Japanese literature on ship icing, including direct measurements of ice accumulated on ship, ice accretion rate and sea spray flux as well as statistical analyses of icing conditions. The report also describes some possibilities of forecasting icing conditions.

SR 77-28 SK 77-28
AIRBORNE SPECTRORADIOMÉTER DATA
COMPARED WITH GROUND WATER-TURBIDITY MEASUREMENTS AT LAKE POWELL,
UTAH: CORRELATION AND QUANTIFICATION OF DATA.

Merry, C.J., Sep. 1977, 38p., ADA-044 793, Bibliography p.26-29.

WATER CHEMISTRY, TURBIDITY, LIGHT TRANSMISSION, SPECTRORADIOMETERS, AERIAL SURVEYS, UNITED STATES—UTAH— LAKE POWELL

LAKE POWELL.

The objective of this study is to correlate and quantify the airborne spectroradiometer multispectral data to ground truth water quality measurements obtained at Lake Powell, Utah, during 1975. A ground truth water sampling program was accomplished during 9-16 June 1975 for correlation to an aircraft spectroradiometer flight. Fleid measurements were taken of percentage of transmittance, surface temperature, pH and secchi disk depth. Also, percentage of light transmittance was measured in the laboratory for the water samples. In addition, electron micrographs and suspended sediment

concentration data were obtained of selected water samples located at Hite Bridge (Mile 171), Mile 168, Mile 150 (along the Colorado River main channel) and Builfrog Bay (Mile 122). Airborne spectroradiometer spectra were selected which correlated to the same test sites.

SR 77-29 INFRARED THERMOGRAPHY OF BUILD-INFS: QUALITATIVE ANALYSIS OF WINDOW INFILTRATION LOSS, FEDERAL OFFICE BUILDING, BURLINGTON, VERMONT. Munis, R.H., et al, Sep. 1977, 17p., ADA-044 942. Marshall, S.J. 32,1360.

32-1360

INFRARED PHOTOGRAPHY, THERMAL DIFFUSION, BUILDINGS, HEAT LOSS, WINDOWS. FUSION, BUILDINGS, HEAT LOSS, WINDOWS. An interior, infrared thermographic survey of single-pase, aluminum-frame, projected windows was performed to pinpoint locations of excessive infiltration. Infrared thermographic inspection accomplishes this more quictly and more accurately than conventional techniques of studying window infiltration. This report presents 32 thermograms and photographs which in many cases dramatically illustrate infiltrations around the mullion, along the top opening cracks, and under the frame/sill interfaces. Poor glazing seals were easily detected and the exact points of glass/frame leakages were pinpointed. Plumes of warn air on the window glass, rising from the convectors, were dramatically captured by the infrared camera system. In several cases, the plumes were noted 12 ft. above the convectors on the top window panels. Heat loss from the convectors was noted through the walls of the building in thermograms taken from the outside. Several recommendations were prepared for the General Services Administration, owner of this Federal Office Building in Burtington, Vermont.

SR 77-30

PAVEMENT RECYCLING USING A HEAVY BULLDOZER MOUNTED PULVERIZER.

Eston, R.A., et al, Sep. 1977, 12p. + appends., ADA-046 008, 8 refa. Garfield, D.E.

32-1361

EXCAVATION, SUBGRADES, PAVEMENT RASES

BASES.

Recycling of paving materials is currently gaining acceptance as a means of economic savings in pavement reconstruction or rehabilitation. Pavements having low serviceability indices due to surface irregularities such as cracks, bumps, spalling, potholes, etc., may be broken up to meet specified granular base course gradation requirements and reused as a base for the new surface. The USACREL developed a permatirost excavating attachment for heavy buildozers and a prototype test rig was constructed.

Tests were conducted on frozen soils, gravels, and lodge.

Tests were conducted on frozen soils, gravels, and lodge.

Tests were conducted on frozen soils, gravels, and lodge.

Tests were conducted many first of the soil of the sections in a CRREL test facility. The resultant processed material did meet Corps of Engineers bese course gradation requirements. The machine can process 120 square ft of pavement structure per minute to a depth of 12 inches. The most uniformly graded material was obtained at a drum speed of 15 revolutions per minute.

Once the pavement structure is broken down from the solid mass (asphalt concrete pavement), the machine does not further break down or pulverize the aggregate.

A minor amount of dust was evident during the operations, but no refinements are recommended.

SR 77-31 EFFECTS OF LOW GROUND PRESSURE VEHI-CLE TRAFFIC ON TUNDRA AT LONELY, ALAS-

Abele, G., et al, Sep. 1977, 32p., ADA-062 446, 13

Brown, J., Brewer, M.C., Atwood, D.M.

AIR CUSHION VEHICLES, TRACKED VEHICLES, TUNDRA VEGETATION, VEHICLE WHEELS, ENVIRONMENTAL IMPACT, DAMAGE, PATTERNED GROUND, SOIL MOISTURE.

Traffic tests were conducted with two low pressure tire Rolligon-type vehicles and a small, tracked Nodwell with minimal load for 1, 5, and 10 vehicle passes on relatively dry tundra near Lonely, Alaska. The traffic impact was limited to compression of the vegetation and the organic mat and a maximum terrain surface depression of several cm, with no shearing or disaggregation of the mat. SR 77-32

AERIAL PHOTOINTERPRETATION OF A SMALL ICE JAM.
DenHartog, S.L., Oct. 1977, 17p., ADA-045 870.

32-1362 ICE JAMS, AERIAL SURVEYS, PHOTOINTER-PRETATION.

Aerial photos of a small ice jam on the Pemigewasett River near Plymouth, New Hampshire, were taken three days after the jam and compared with photos taken after the ice went out. The winter photos show a marked and sudden decrease in floe size apparently indicative of faster and longer movement of the ice. The spring photos show a number of shallows and obstructions that apparently had no effect on the ice movement. It is concluded that this jam was caused by a change in slope and subsequent reduction in velocity.

LAND TREATMENT OF WASTEWATER AT WEST DOVER, VERMONT.

nizoun, J.R., Oct. 1977, 24p., ADA-046 300, 12 refs. 32-1363

WASTE DISPOSAL WATER TREATMENT, SEWAGE TREATMENT.

SEWAGE TREATMENT.

A general description of a westewater land treatment system located in a "cold temperate" climatic region is given. The winter season average daily design flow is almost double that of the summer-hall season (0.55 MGD vs 0.30 MGD). Wastewater is sprayed on a forested knoll after it receives secondary biological treatment. The system is operated during the winter when the ambient air temperature is as low as 10F. Spray nozzles have been developed that ensure rapid drainage of the spray laterals after each spray cycle and, therefore, prevent their freezing.

SR 77-34

CANOL PIPELINE PROJECT: A HISTORICAL

Ueda, H.T., et al, Oct. 1977, 32p., ADA-046 707, 8 refs.

Garfield, D.E., Haynes, F.D.

32-1364

PIPELINES, HISTORY, ARCTIC LANDSCAPES. This report is a historical review of the Canol project, the first long-distance petroleum pipeline system constructed in the Arctic region of North America. The project we first long-distance petroleum pipeline system constructed in the Arctic region of North America. The project was initiated during the early days of World War II when the military situation appeared critical. It was designed to supply the military need for fuel in the area, particularly Alaska, by exploiting the Norman Wells oil field in the Northwest Territory of Canada. The system was completed in April 1944 and operated for 11 months converting 975,764 barrels of crude oil into gasoline and fuel oil. Construction for the pioneering effort was difficult and costly. Considerable controversy plagued the project throughout; nevertheless, its completion proved that undertakings of such magnitude could be accomplished despite the formidable problems of the Arctic. could be a the Arctic.

SR 77-35

CEMENTS FOR STRUCTURAL CONCRETE IN CC'LD REGIONS

Johnson, R., Oct. 1977, 13p., ADA-046 302, 19 refs.

WINTER CONCRETING, CONCRETE ADMIX-TURES, CONCRETE STRENGTH, CONCRETE CURING, CEMENTS.

CURING, CEMBNIS.

A literature search was undertaken to collect information on cements which could be used in structural concrete and would cure at low temperatures. In the literature search, it types of cements or concrete manufactured by various firms were reviewed. Trade names are identified with their cement or concrete description, temperature range for curing, use experience and application, approximate cost (in 1976), and reference source or manufacturer.

SR 77-36

SMALL COMMUNITIES RESULT IN GREATER SATISFACTION: AN EXAMINATION OF UN-DERMANNING THEORY.

Ledbetter, C.B., Nov. 1977, 15p., ADA-046 817, 3

refs. 32-1367

HUMAN FACTORS, THEORIES.

HUMAN FACTORS, THEORIES.
Roger Barker's undermanning theory states that the smaller an organization, the greater the degree of undermanning, resulting in greater inhabitant satisfaction. This theory is examined using the National Opinion Research Center's General Social Survey for 1974. Two groups of survey variables were dichotomized and net transmittances or coefficients of correlation for the system were determined. Two groups of variables were chosen: objective groups, such as age and income, and subjective ones, such as sociability and job satisfaction. The only positive correlation found was that people residing in small communities are more satisfied with their community than are people who live in large communities. Only a small portion of this is explained by the degree to which small town inhabitants are satisfied with their financial situation.

UTILIZATION OF SEWAGE SLUDGE FOR TER-RAIN STABILIZATION IN COLD REGIONS. Gaskin, D.A., et al, Nov. 1977, 45p., ADA-047 368. Hannel, W., Palazzo, A.J., Bates, R.E., Stanley, L.E.

32-1368

32-1368
SOIL STABILIZATION, SLUDGES, EROSION CONTROL, SEWAGE, VEGETATION.
A terrain stabilization research/demonstration site was constructed in May 1974 at Hanover, New Hampshire, to investigate various combinations of physical, chemical and biological techniques for terrain stabilization in cold regions. Fourteen test plots (10 x 40 ft) with individual 350 gal tanks to collect aediment were installed on a 16 deg slope. These 14 test plots were to examine the effectiveness of sewage sludge and primary effluent on terrain stabilization in cold regions. In 13 of the 14 plots the variables studied were nutrient source (fertilizer, sludge, and primary wastewater), moisture (trrigated and nonirrigated), erosion control material (jute netting, straw tacked with a tacking compound), no erosion control material and vegetation (three grasses and two legumes). The control plot was left bare of seed,

fertilizer and erosion control material for comparison. A 20,000 sq ft area adjacent to the 14 plots was installed for general testing of various combinations of tacking chemicals, plastic netting, straw, and wood fiber mulch. In general, all treatments with the exception of two plots were effective in reducing soil lose in comparison with the control which had a loss of 34,531 lb of soil (dry weight) on a per acre basis.

SR 77-38

FINITE ELEMENT MODEL OF TRANSIENT HEAT CONDUCTION WITH ISOTHERMAL PHASE CHANGE (TWO AND THREE DIMEN-SIONAL).

Guymon, G.L., et al, Nov. 1977, 167p., ADA-047 369. Hromadka, T.V., II.

32-1369

THERMAL CONDUCTIVITY, MATHEMATICAL MODELS, COMPUTERIZED SIMULATION, FROZEN GROUND MECHANICS, COMPUTER

PROGRAMS.

The partial differential equation for transient heat conduction is solved by a finite element analog using a quadratic weighting function for the discretized spatial domain. The transient problem is solved by the Crank-Nicolson approximation. Two dimensional and three dimensional models incorporated in the same computer program are presented. The finite element method is reviewed, assumptions and limitations upon which the model is based are presented, and a complete derivation of the system analog is included. Certain problems can only be modeled as a three dimensional system, e.g., thaw degradations around roadway culverts, embankment dams on permatrost where dam length is short relative to dame on permatrost where dam length is short relative to dam width, and thaw and freezeback under buildings. In most cases, however, the more economical two dimensional model can be used. Numerical tests of both models have been accomplished but field verification has not been attempt-ed. A user's manual and a FORTRAN IV computer listing of the program are presented.

SR 77-39 SK 77-39
TEMPORARY PROTECTION OF WINTERTIME
BUILDING CONSTRUCTION, FAIRBANKS,
ALASKA, 1976-77.
Bennett, F.L., Nov. 1977, 41p., ADA-048 987, 2 refs.

COLD WEATHER CONSTRUCTION, BUILD-INGS, HEATING.

INGS, HEATING.

Nine building construction projects, whose total area exceeds one half million square feet, were under construction in Fairbanks, Alaska, area during the winter of 1976-77. These projects were studied to determine the methods used for providing temporary enclosures and temporary building heating during the construction process. The types of construction activities underway at various temperature conditions are reported, and a record of temperature variations in the buildings under construction is discussed. Both black and white and color photo documentation was developed, and several black and white photographs are included in this report. SP 77-40

WINTER EARTHWORK CONSTRUCTION IN

UPPER MICHIGAN. Hass, W.M., et al, Nov. 1977, 59p., ADA-049 052, 5 refs. Sec also 32-293.

Alkire, B.D., Dingeldein, J.E. 32-2698

EARTHWORK, SUBGRADE PREPARATION, COLD WEATHER CONSTRUCTION, FROZEN GROUND.

Winter earthwork construction was observed in three counties in Michigan's Upper Peninsula during the 1975-76 season. In all cases, construction methods are used which exclude frozen soil from the central core of the embankment, with frozen soil permitted in the outer slope zone. While all projects were technically successful, construction was halted and which the projects were technically successful, construction was halted. all projects were technically successful construction was halted in early February on one project because it was uneconomical for the contractor to continue. On another project, the contractor successfully exploited soil freezing to form stable amonth haul roads for his scrapers. Most of the work consisted of raising the grade of existing roads by 18 inches of non-frost-succeptible soil to minimize frost heaving and loss of bearing capacity. This winter activity resulted in better utilization of county equipment and work crews.

1977 CRREL-USGS PERMAFROST PROGRAM BEAUFORT SEA, ALASKA, OPERATIONAL RE-

BEAUTY STATES AND STATES AND STATES AND A-048 985, 11 refa. See also 32-1248 (SR 76-12, ADA-032 440). Chamberlain, B.J., Ueda, H.T., Blouin, S.E., Garfield, D.E., Lewellen, R.I.

OFFSHORE DRILLING, DRILL CORE ANALYSIS, SUBSEA PERMAFROST, BOTTOM SEDI-MENT, TEMPERATURE MEASUREMENT.

MBASUREMENT:
During the spring of 1977 soil samples were obtained in
the Prudhoe Bay area from one hole drilled on land and
five holes drilled offkhore. The study is a continuation
of the wrogram started the previous season to ramine the
engineering chara-ceristics and properties of permafrost under
the Beaufort Sea. Emphasis was placed on establishing
the range of thermal and physical properties found in this
geological setting, which is thought to be common to much

of the eastern Alaska coastal zone. Twenty-seven probe aites were selected to determine local engineering properties and temperature conditions, and to aid in interpreting the lithology between the drill holes. Core drilling information from some of the probe sites was used as control for interpreting the probe records. Deep thermal and geological information was obtained from the drill sites by the USGS personnel participating in the study. Maximum drill hole depth was 618 or (225 8) and maximum constraints death was was obtained from the drill sites by the USGS personnel participating in the study. Maximum drill hole depth was 68.5 m (225 ft) and maximum penetration depth was 15 m (50 ft). The probe temperature data indicated the presence of permafroat in all holes. Probe penetration resistance measurements helped to delineate shallow, iconded zones, some of which may have been only seasonal. In the core study, frozen sediments were found in only one hol : approximately the 29.6-m (97-ft) depth. Fine-grained iments were more common than course-grained material: and showed general increase in thickness with increasing distance from shore. The only departure from the material. and showed general increase in thickness with increase ing distance from shore. The only departure from the previous year's field drilling techniques was the use of larger diameter, thick-walled casing and an air-operated casing driver. The probe equipment and techniques employed, however, represented a significant improvement over the prototype equipment used in 1976.

SR 77-42 GROUTING OF SOILS IN COLD ENVIRON-MENTS: A LITERATURE SEARCH.

Johnson, R., Dec. 1977, 49p., ADA-049 436, 52 refs.

GROUTING, ADMIXTURES, SOIL STRENGTH. A literature search was undertak... to collect information on grouting of soils as related to low temperature environment, 40 F and below. This report reviews existing literature and the state-of-the-art on conventional grouting engineering methods and materials to seek which may be used in thawed or dry, forcen ground and to establish the need of new methods and techniques where conventional grouting methods fail

SR 77-43
CRREL ROOF MOISTURE SURVEY, BUILD-ING 208 ROCK ISLAND ARSENAL.
Korhonen, C., et al, Dec. 1977, 6p., ADA-051 490.
Dudley, T., Tobiasson, W.
32-2730

ROOPS, MOISTURE, INFRARED RADIATION. ROOPS, MOISTURE, INFRARED RADIATION.
The roof of building 208 at Rock Island Arsenal was surveyed for wet insulation using a hand-held infrared camera.

10125 of wet insulation were marked with spray paint on the roof and 3-in-diam core samples of the build-up membrane and insulation were obtained to verify wet and dry conditions. Roof defects uncovered during a visual inspection were also marked with spray paint. The majority of the wet area detected are associated with flashing flaws, which are considered responsible for the wet insulation. Recommendations for maintenance of this roof are based on information derived from the infrared survey, core samples and visual examinations.

FATE AND EFFECTS OF CRUDE OIL SPILLED ON PERMAPROST TERRAIN. SECOND AN-NUAL PROGRESS REPORT, JUNE 1976 TO JULY 1977.

McFadden, T., et al, Dec 1977, 46p., ADA-061 779, 4 refs. Includes progress report for the first year, CRREL SR 76-15, q.v. 32-1257. Jenkins, T.F., Collins, C.M., Johnson, L.A., McCown,

B.H., Sparrow, E.B. 33-1528

OIL SPILLS, DAMAGE, CHEMICAL REACTIONS, FROZEN GROUND, ENVIRONMEN-TAL IMPACT, VEGETATION.

TAL IMPACT, VEGETATION.

This spill was compared with one that took place in February 1976 (reported upon in the first annual progress report). Oil moved downslope at a much faster rate during the summer spill than during the winter spill. In the winter he oil cooled and pooled rapidly. The summer spill covered approximately one-third more surface area than did the winter spill in the final configuration, even though the two spills were of almost identical volume. Increases in microbial populations and activities during the months following the spill were evident. Increased counts of bacteria, yeasta, denitrifying bacteria, and petroleum-degrading bacteria following the spills were particularly evident. Analysis of oil decomposition using gas chromatography techniques indicated that the low molecular weight fractions, methane and etane, were lost almost immediately after the spill each case. Fractions in the C3 to C9 range were reduced aignificantly in two months and were nearly zero at the end of five months. An obvious adverse effect on vegetation was noted in both spills. Biological damage from the summer spill appeared to exceed that from the winter spill. SR 78-01

RECOMMENDATIONS FOR IMPLEMENTING ROOF MOISTURE SURVEYS IN THE U.S. ARMY.

U.S. Army CRREL/WES/FESA Roof Moisture Research Team, Aug. 1978, 8p., ADB-031 978L, Distribution limited to U.S. Government agencies only. 33-1534

MOISTURE METERS, ROOFS, IN

Nuclear, infrared, capacitance, microwave and impulse radar methods for non-destructively detecting moisture in roofs

were evaluated. No system was reliable enough by itself or by cross-checking with another system to eliminate the need for a few core samples of membrane and insulation to verify findings. Airborne infrared surveys are a cost-effective way of reconnoitering numerous roofs at a major installation. However, follow-up on-the-roof surveys are necessary. Of the several grid techniques examined, nuclear surveys were the most reliable. Hand-held infrared surveys were the most reliable. surveys were the most reliable. Hand-held infrared surveys are the most accurate on-the-roof method studied. Although an infrared camera costs significantly more than a nuclear meter (\$25K vs. \$3K), infrared surveys can be conducted more rapidly. Since the Army has numerous roofs to survey, infrared surveys appear to be the most cost-effective method. For reasons of continuity, accuracy and economy, the Army should establish its own capability to survey roofs for moisture. Implementation should not be at the installation level. A centralized team of roof moisture surveying specialists, skilled in operating infrared equipment but, more importantly, skilled in roofing technology, should be established. The team should both conduct and contract for airborne and on-the-roof infrared surveys. The CRREL/-WES/FESA roof moisture research group has initiated development of training aids for use by such a team.

SR 78-02 ARCHITECTURAL PROGRAMMING: MAKING SOCIALLY RESPONSIVE ARCHITECTURE MORE ACCESSIBLE.

Ledbetter, C.B., Mar. 1978, 7p., ADA-052 153, 6 refs.

BUILDINGS, DESIGN.

SR 78-03 PHYSICAL MEASUREMENT OF ICE JAMS 1976-77 FIELD SEASON.

Wuebben, J.L., et al, Mar. 1978, 19p., ADA-053 260, 2 refs.

Stewart, D.M. 32-3538

RIVER ICE, ICE JAMS, ICE COVER THICKNESS, MEASUREMENT.

MEASUREMENT.

Three shallow stream ice jams which occurred on the Ottauquechee River in Vermont during the 1976-77 winter season
are documented. Measurements of the variation in jam
thickness along the longitudinal profile of the jams are given
along with the variation in surface ice floe sizes. These
measurements are compared with those of previous work.
All jams were caused to some extent by hackwater conditions
in the river. The effects of an ice cover and the ice
jams on the longitudinal water surface profiles are examined
and compared with open water conditions.

SR 78-04
LARGE MOBILE DRILLING RIGS USED
ALONG THE ALASKA PIPELINE.
Sellmann, P.V., et al, Mar. 1978, 23p., ADA-053 536.

Mellor, M. 32-3539

PIPELINES, DRILLING, UNITED STATES ALASKA.

The requirement for installing more than 70,000 vertical support members along elevated sections of the Alaska Pipeline resulted in an extremely large drilling program. Several large drilling units, some specially designed, including rotary (auger), percussive, and combination rotary-percussive units, were selected for this job. This selection of equipment and techniques provided the potential to drill in all conceivable material types. An examination of these drills in the and techniques provided the potential to drill in all conceivable material types. An examination of these drills in the field, together with product literature, provided some insight into the characteristics of these drills compared with other commercially available drilling units. The pipeline drilling program provided a major impetus for design and development of new equipment in the area of large rotary-percussive and percussive drilling units. The pipeline drills in general showed sound design characteristics in weight, power, thrust, torque, and speed. Many of the auger boring heads could benefit from improvements in shape, angles, cutter position, and in consideration of "the center of the hole" problem. Need for work in this area was indicated by drilling rates, as well as by noticeable improvements in some augers following contractors' field modifications.

SR 78-05

SPECIALIZED PIPELINE EQUIPMENT. Hanamoto, B., Mar. 1978, 30p., ADA-055 715, 3 refs.

PIPELINES, CONSTRUCTION EQUIPMENT, PIPELINE INSULATION, COLD WEATHER CONSTRUCTION, UNITED STATES—ALASKA. CONSTRUCTION, UNITED STATES—ALASKA. The use of specialized heavy equipment in the construction phase of the 800-mile Trans-Alaska Pipeline is described. The types include equipment used in bending, taping and insulating the 48-in. plpe used for the pipeline. Stretching from Prudhoe Bay on the North Slope and Beaufort Sea to the southern terminal at Valdez on the Prince William Sound and the Gulf of Alaska, the pipeline construction task, with the combination of varied arctic terrain, severe climatic conditions, conservational and and environmental restraints, and rigid scheduling is a project unlike any that has been undertaken before. SR 78-06

COMPUTER PROCESSING OF LANDSAT DIGI-TAL DATA AND SENSOR INTERFACE DEVEL-OPMENT FOR USE IN NEW ENGLAND RESER-VOIR MANAGEMENT.

Merry, C.J., et al, Apr. 1978, 61p., ADA-055 762, Refs. p. 40-44. McKim, H.L.

32-4373

RESERVOIRS, REMOTE SENSING, SNOW WATER EQUIVALENT, LANDSAT, FLOODS, WATER SUPPLY, COMPUTER APPLICATIONS. A preliminary analysis of Landast digital data using the NASA GISS computer algorithms for a February 11 scene of the upper St. John River Basin, Maine, showed that the total radiance of pixels contained in three snow courses varied from 5.34 to 7.74 mW/sq cm sr for a water equivalent of approximately 24.1 cm (9.5 in.) of water. This correlation ween radiance values and water equivalent of the anowpack needs to be tested. A multispectral signature was cloped with an accuracy of 75% for a wetlands category he Merrimack River estuary. Low-water reservoir and developed with an accuracy of 75% for a wetlands category in the Merrimack River estuary. Low-water reservoir and flood water stages were mapped from grayscale printouts of MSS band 7 for October 27, 1972, and July 6, 1973, respectively, for the Franklin Falls reservoir area, New Hampshire. Two snow pillow transducer systems for measuring the water equivalent of the snowpack in northern Maine were interfaced and field tested. A water quality monitor interfaced to the Landsat DCS was field tested in northern Maine and transmitted the following water quality information: pH, dissolved oxygen, river stage, water temperature and conductivity. A thermocouple system was successfully interfaced and field tested at Sugarlosf Mountain, Maine. Temperature data from the surface to a depth of 30 m (100 ft) were transmitted through the Landsat DCS. Also, a tensioneter/transducer system to measure moisture tension and soil volumetric moisture content was successfully interfaced to the Landsat DCS.

SR 78-07

FRESH WATER SUPPLY FOR A VILLAGE SUR-ROUNDED BY SALT WATER—POINT HOPE,

McFadden, T., et al, Apr. 1978, 18p., ADA-054 147, 9 refs.

32-3964 WATER SUPPLY, GROUND WATER, PERMA-FROST HYDROLOGY.

FROST HYDROLOGY.

Point Hope is a village located on a narrow gravel spit textending eight miles out into the Bering Sea. Studies to locate an adequate fresh water source for the village have yielded two possible supplies which will fill the needs of the village. The first is a ground water supply existing on top of the undulating permafrost layer which underlies the gravel spit. This supply consists of several million gallons of water and can be augmented with snow fences which will drift blowing snow into areas where it will drain into the aquifer when it melts. Excess water will overflow the sides of the natural permafrost basin into the ocean on both sides of the spit. The second source is a small lake located approximately four miles from the village. The lake provides water of adequate quality and quantity to be used as a raw water supply; however, this source is not as desirable since it is surface water and supports a higher level of bacterial contamination. In addition, it is a much greater distance from the village, and longer, higher level of bacterial contamination. In addition, it is a much greater distance from the village, and longer, much more expensive piping would be required to get the water to the village.

SR 78-08 METHODOLOGY FOR NITROGEN ISOTOPE ANALYSIS AT CRREL

Jenkins, T.F., et al, Apr. 1978, 57p., ADA-054 939, 9

Quarry, S.T. 32-4374

SOIL CHEMISTRY, WASTE DISPOSAL, ISO-TOPE ANALYSIS, NITROGEN ISOTOPES, COM-PUTER APPLICATIONS.

PUTER APPLICATIONS.

This report documents the chronology of events and the procedures employed in developing a nitrogen isotope analysis capability at the U.S. Army Cold Regions Research and Engineering Laboratory. Both the instrumental and wet chemistry procedures are reported to enable others interested in the procedures to obtain useful data. The procedures described have resulted in the ability to measure the 15-N/14-N ratio to a precision of 0.001 atom %, a value easily within the acceptable range for tracer experiments. SR 78-09

IMPROVED DRAINAGE AND FROST ACTION CRITERIA FOR NEW JERSEY PAVEMENT DE-SIGN. PHASE 2: FROST ACTION. Berg, R.L., et al, May 1978, 80p., ADA-055 785, Nu-

merous refs. passim.

McGaw, R. 32-4380

FROST ACTION, PAVEMENTS, FROST HEAVE, DRAINAGE, THERMAL CONDUCTIVITY, FROST PENETRATION, SOIL FREEZING, COM-PUTER APPLICATIONS.

Before constructing actual pavements with open-graded drainage layers in New Jersey, the influence of the drainage

layer on frost penetration beneath hypothetical pavements was analytically examined. Thermal conductivity values of several New Jersey soils, stabilized drainage layer materials, and pavement samples were measured using the Guarded Hot Plate method or the probe method. Frost penetration depths were computed using the modified Berggren equations. Mean air freezing indexes used in the computation ranged from 50 deg-days in Atlantic City to 480 deg-days in Newton. Design freezing indexes ranged from 250 deg-days to 900 deg-days for the same two sites. Maximum computed frost depths ranged from 0.8 to 2.1 ft beneath conventional paverments, i.e., those without drainage layers. For pavements incorporating an open-graded drainage layer, computed maximum frost depths ranged from 0.8 ft to 1.4 ft. It was concluded that frost penetration beneath a pavement including an open-graded drainage layer would be approximately equal to a pavement without the drainage layer at the same site.

1977 TUNDRA FIRE AT KOKOLIK RIVER. ALASKA.

Hall, D.K., et al, Aug. 1978, 11p., ADA-062 439, 10 refs. For this paper from another source see MP 1125, 32-4577.

Brown, J., Johnson, L.A. 35-2591

RA, FIRES, VEGETATION, DAMAGE, DEPTH, REMOTE SENSING, SPACE-TUNDRA, BORNE PHOTOGRAPHY, LANDSAT.

BORNE PHOTOGRAPHY, LANDSAT.

During summer 1977 widespread fires occurred in northwest Alaska. Through the use of Landsat imagery and ground studies, one such fire, at Kokolik River was examined. The Kokolik fire was first reported on 26 July, and by the time it was extinguished had consumed 44 sq km of tundra vegetation. Streams and drainages contained the fire on several sides. Ground observations provided information on the intensity of the fire effects. Depth of thaw by late August measured 35.4 cm in the burned areas and 26.6 cm in the unburned areas.

CONSTRUCTION EQUIPMENT PROBLEMS AND PROCEDURES: ALASKA PIPELINE PRO-JECT.

Hanamoto, B., June 1978, 14p., ADB-029 226, 4 refs. Distribution limited to U.S. Government agencies

only. 33-1535

COLD WEATHER PERFORMANCE, CONSTRUCTION EQUIPMENT, PIPELINES, ENGINES, HUMAN FACTORS.

The Trans-Alaska pipeline construction project posed many problems which are not encountered in the more temperate regions. Construction equipment maintenance and opera-tion is of major concern in the far north. Difficulties encountered were due to: extreme low temperature of -30F (-57C) and common winter temperatures of -30F (-34C), the remoteness and isolation of the work area, harsh environment, and the working personnel. This report de-scribes some of the typical problems encountered with con-struction equipment on this project and some of the remedies and procedures for solving these problems.

SR 78-12 SOIL LYSIMETERS FOR VALIDATING MODELS OF WASTEWATER RENOVATION BY LAND APPLICATION.

Iskandar, I.K., et al, June 1978, 11p., ADA-059 994, 12 refs.

33-1536 MOISTURE METERS, WATER TREATMENT, WASTE DISPOSAL, MODELS.

This report describes the construction, operation and performance of large-scale (90 cm-inside diameter and 150-cm-high) lysimeters. These lysimeters can continuously monitor soil moisture flow, soil temperature and redox potential with depth, and sample soil water and soil air with depth. The depth, and sample soil water and soil air with depth. The rate of soil water movement to the groundwater was continuously monitored by a rain gage and a recorder. To simulate field condition, an automatic spray system was developed; this system is also described in this report. The total cost of one lyaimeter is approximately \$650 (1975 estimate). The total cost of one lyaimeter is approximately \$650 (1975 estimate). The lysimeters are being used to validate a biophysical-chemical model of wastewater renovation by application to land. Detailed blueprints of the lyaimeters are kept at CRREL and are available on request.

ECOLOGICAL BASELINE INVESTIGATIONS ALONG THE YUKON RIVER-PRUDHOE BAY HAUL ROAD, ALASKA.

Brown, J., ed, Sep. 1978, 131p., ADA-060 255, For this item as a progress report to the U.S. Department of Energy and for individual papers see 32-3888 through 32-3896.
33-1537

33-1537
RESEARCH PROJECTS, ECOLOGY, TUNDRA VEGETATION, ROADS, CLAY SOILS.
Results of the first full year's field research on five projects along the Yukon River-Prudhoe Bay Haul Road are reported. Several projects are extensions of investigations begun in 1976 and are being conducted in cooperation with a Federal

Highway Administration sponsored environmental engineering study. The extent and success of weeds and weedy species along the road and in material sites has been followed for summer 1976 and 1977. In order to document the vegetation along the complex elevational and latitudinal gradient and its potential for impact and recovery, 17 vegetation maps have now been completed, and vegetation described and plots established at 120 locations along the 600-kilometeriong road. Collections of vascular plants, bryophytes and lichens were made and catalogued for an additional 9 sites. Sampling for soil invertebrates to determine their sensitivity to impact was undertaken at approximately 25 sites. A detailed study of the impact of road dust upon the vegetation was initiated at one tundra site, and four sites were established to monitor the amount of dust transported onto the tundra across 1000-meter-long transects. The clay mineralogy and chemistry of the dust and road material were investigated. SR 78-14 Highway Administration sponsored environmental engineering

GROCHEMISTRY OF SUBSEA PERMAFROST AT PRUDHOE BAY, ALASKA. Page, F.W., et al, Sep. 1978, 70p., ADA-060 434, Refs. p.62-68. Iskander, I.K.

33-1543

SUBSEA PERMAFROST, SEDIMENTS, SEA WATER, CHEMICAL ANALYSIS, DRILL CORE ANALYSIS, SALINITY.

ANALYSIS, SALINITY.

The analytical data from sediment, interstitial water, and seawater analyses of samples collected near Prudhoe Bay, Alaska, during the period from March to May 1977, are presented. Analyses include determinations of moisture, calcium carbonate, and organic carbon contents in the sediment samples and pH, electrical conductivity, alkalinity, and concentrations of sodium, potassium, calcium, magnesium, chloride, and sulfate in the interstitial water and seawater samples. Salinity, ionic balance, and freezing point of the water samples were calculated. The marine sediments in Prudhoe Bay generally contain more calcium carbonate, organic carbon, and interstitial water than the underlying glacial and fluvial gravels. On land, a surficial layer of peat also had high organic carbon and moisture contents. The salinity of the seawater samples varied from concentrated brines near the shore where sea ice is frozen directly to, or is located near, the sea bottom to water which was 1.0 to 1.5 ppt less saline than normal seawater at a distance of approximately 10 to 15 km from shore.

SER 78-15

SR 78-15 WATERPROOFING STRAIN GAGES FOR LOW AMBIENT TEMPERATURES

Garfield, D.E., et al, Sep. 1978, 20p., ADA-061 749, 10 refs.

McLain, B.G.

33-1544

STRAIN MEASURING INSTRUMENTS, LOW TEMPERATURE TESTS, PREEZE THAW CY-CLES, WATERPROOFING.

CLES, WATERPROOFING.
Due to recent problems experienced with strain-gage based transducers immersed in water at below-freezing ambient temperatures, a test program was conducted to determine if commercially available strain-gage waterproofing systems could withstand these conditions. A total of 96 combinations of eight waterproofing systems, three beam materials and four strain gage adhesives were evaluated. Test environments included strain cycling at temperatures from +32F to +73F and freeze-thaw cycling from -33 to +90F. Only one waterproofing system withstood all tests with no failures. Other results ranged from one installation failure on three systems to the failure of all 12 installations of one system. SR 78-16 SR 78-16

EFFECTS OF LOW GROUND PRESSURE VEHI-CLE TRAFFIC ON TUNDRA AT LONELY, ALAS-

Abele, G., et al, Sep. 1978, 63p., ADA-061 777, 18

refs.
Walker, D.A., Brown, J., Brewer, M.C., Atwood, D.M.

TUNDRA VEGETATION. TIRES, SOIL TRAFFI-CABILITY, DAMAGE.

CABILITY, DAMAGE.

Traffic tests were conducted with two low-pressure-tire Rolligon-type vehicles and a small, tracked Nodwell for 1,5, and 10 vehicle passes on tundra near Lonely, Alaska. The traffic impact was limited to compression of the vegetation and the organic mat and a maximum terrain surface depression of several centimeters, with virtually no shearing or disaggregation of the mat. After one year, the visibility of the traffic signatures had increased, surface depression remained the same, and the thaw depth below the multiple pass tracks had increased a few centimeters.

SR 78-17
EFFECTS OF WINTER MILITARY OPERATIONS ON COLD REGIONS TERRAIN. Abele, G., et al, Sep. 1978, 34p., ADA-061 260. Johnson, L.A., Collins, C.M., Taylor, R.A.

COLD WEATHER OPERATION, MILITARY OPERATION, DAMAGE, ENVIRONMENTAL IMPACT, VEGETATION.

Observations were made on the 1977 winter military maneuver sites south of Psirbanks to obtain base line data for monitoring terrain and vegetation recovery from the impact of winter trail preparation, and vehicular and troop activities in various terrains and vegetation types.

GUIDE TO THE USE OF 14N AND 15N IN ENVI-RONMENTAL RESEARCH.

Edwards, A.P., Sep. 1978, 77p., ADA-060 385. 33-1768

WASTES, WATER CHEMISTRY, ISOTOPIC LA-BELING, RESEARCH PROJECTS.

BELING, REBEARCH PROJECTS.

The fate of the mineral nitrogen in wastewater can be established only through natural or artificial stable isotopic labeling. This report assesses the possibilities and problems associated with such tracer techniques applied to the small amounts of nitrogen normally present after secondary waste treatment. The methods outlined for sample processing to minimize analytical errors are applicable to other types of environmental research involving isotope ratio analysis as a means of tracing nitrogen in the biosphere.

SR 78-19 SELECTED BIBLIOGRAPHY OF DISTURBANCE AND RESTORATION OF SOILS AND VEGETATION IN PERMAPROST REGIONS OF THE USSR (1970-1977).

Andrews, M., Oct. 1978, 175p., ADA-062 339.

BIBLIOGRAPHIES, HUMAN FACTORS, ENVI-RONMENTAL IMPACT, CONTINUOUS PER-MAFROST, DISCONTINUOUS PERMAFROST, REVEGETATION, CRYOGENIC SOILS, DAM-AGE.

AGE.

This compilation of literature, published in Russian since 1970, comprises 1225 bibliographic citations relating to disturbance and restoration of soils and vegetation. Sixty-five percent of these were found by a manual search of CREEL bibliography Vols. 25-32; the others were obtained through off-line searches from the relevant computerized data bases and personal files. Only one of these data bases, that of the National Agricultural Library, is shown to be of significance in providing a valuable checking source. The literature is discussed in chronological fashion, with general statements followed by highlights of each year's contributions. The years 1972 and 1973 produced the most publications by the indexing services. A trend is apparent from a reconnaissance and description approach in earlier papers toward an integrated ecosystem approach in earlier papers toward an integrated ecosystem approach in more recent toward an integrated ecosystem approach in the effects of disturbance on the permafrost environment, and the importance of restoration and preservation of these environments, are reflected in the recent literature, particularly in symposium proceedings.

SR 78.20 EFFECTS OF WASTEWATER AND SEWAGE SLUDGE ON THE GROWTH AND CHEMICAL COMPOSITION OF TUREGRASS.

Palazzo, A.J., Nov. 1978, 11p., ADA-061 878, 17 refs. 33-1349

WASTE DISPOSAL, SEWAGE DISPOSAL, GRASSES, GROWTH, CHEMICAL COMPOSI-TION.

TION.

A greenhouse study was conducted to determine the effects of wastewater and sewage applications on the growth and chemical composition of two turfgrass mixtures. A mixture of tall fescue and annual ryegrass. As mixtures of Kentucky bluegrass, red fescue and annual ryegrass. The mixtures were grown in pots of Charlton silt loam in a greenhouse. Prior to seeding, soil in some pots was amended with sludge at rates of 45 or 90 g/pot. Commercial fertilizer supplying N, P, and K was incorporated with soil in pots designated as controls. Treated municipal wastewater was applied on unamended and sludge-amended soil at rates of 5 or 10 cm per week. Wastewater and sludge treatment increased yields, and total uptake of N, P, K, Za, Cd, P, Cu, and Ni by the turfgrasses differed by treatment. The two grass mixtures were similar with regard to yields and composition. Larger yields corresponded to greater plant uptake of N, P, K, and metals. SR 78-21

CLIMATIC SURVEY AT CRREL IN ASSOCIA-TION WITH THE LAND TREATMENT PRO-JECT.

Bilello, M.A., et al, Nov. 1978, 37p., ADA-062 518, 39 refs.

33-1542

MICROCLIMATOLOGY, WASTE DISPOSAL, WATER TREATMENT, WASTE TREATMENT, METEOROLOGICAL DATA.

METEOROLOGICAL DATA.

During 1972, six test cells were constructed at CRRBL for the purpose of studying application of wastewater on various soil types and vegetation. In conjunction with this program, a meteorological observing station was established in order to obtain basic information on the climate proximate to the test cells. This report describes the equipment and its installation, and provides a daily tabulation of the following observed parameters: maximum and minimum air temperatures, relative humidity, dew point, wind speed and direction, precipitation amounts, depth of snow on the ground, solar radiation and pan evaporation. The meteorological data collected during the period starting Oct. 1, 1972, to Mar. 31, 1974, were then summarized; and the results are presented in a series of graphs and line diagrams. The meteorological parameters recorded at CRRBL were then examined to determine how weather can constrain or

help year-round operation of wastewater application to the land. The positive and negative effects of air temperature, precipitation, wind speed, evaporation and snow cover, with respect to land treatment of wastewater, were evaluated. Although no specific recommendations or conclusions are given, the influences of these climatic elements as observed at the CRREL wastewater site are presented for consideration.

COMPUTER FILE FOR EXISTING LAND AP-PLICATION OF WASTEWATER SYSTEMS: A USER'S GUIDE.

Iskandar, I.K., et al, Nov. 1978, 24p., ADA-062 658, 4 refs.

Robinson, D., Willcockson, W., Keefauver, E. 33-2521

WASTE DISPOSAL, WATER TREATMENT, COMPUTER PROGRAMS.

COMPUTER PROGRAMS.

Two computer programs, both written in BASIC, have been developed to store and retrieve information on existing wastewater land treatment systems. The purpose of establishing these programs is to provide assistance to design engineers during the planning of new land treatment systems by making available the design criteria and performance characteristics of operating systems. The SEARCH program is designed to locate systems with specific design parameters, such as flow rate, waste type, capilication rate and mode, ground cover and length of operation. The printout from SEARCH includes a list of articles on similar systems in addition to the design parameters. The UPDATE program is used for the revision of information on file. Currently, there are about 350 domestic and 75 foreign systems on file.

SR 78-23 ENGINEERING ASPECTS OF AN EXPERIMEN-TAL SYSTEM FOR LAND RENOVATION OF SECONDARY EFFLUENT.

Nyiund, J.R., et al, Nov. 1978, 26p., ADA-062 923. Larson, R.E., Clapp, C.E., Linden, D.R., Larson, W.E.

WASTE DISPOSAL, WATER TREATMENT, WASTE TREATMENT, IRRIGATION, LAND RECLAMATION.

RECLAMATION.

A research system was designed and installed at the Apple Valley Wastewater Treatment Plant, two miles south of Rosemount, Minnesota, to develop agricultural management practices for removal of nitrogen from municipal wastewater effluent. A solid set irrigation system was designed and installed to apply wastewater effluent to 1.2 test blocks, each measuring 60 x 150 ft. A perforated plastic drainage tile was placed lengthwise in each block at a depth equivalent to the normal water table level and opening at one end of the block into a sampling station. Six blocks were planted to corn and six planted to eight species of forages. The effluent was applied at rates up to 15 ft/yr. This report presents the engineering considerations in the design of a solid set irrigation system and drain tile and monitoring system for evaluating the influence of the effluent application and agronomic practices on drainage waters. and agronomic practices on drainage waters.

ROOF CONSTRUCTION UNDER WINTER-TIME CONDITIONS: A CASE STUDY. Bennett, F.L., Nov. 1978, 34p., ADA-062 519.

ROOFS, COLD WEATHER CONSTRUCTION, INSULATION, CONSTRUCTION MATERIALS. This report describes construction of the roof of an addition to the Interior City Branch of the First National Bank of Anchorage, located in downtown Fairbanks, Alaska, during the 1976-77 winter. The report documents the schedule and procedure for building the roof, reports successful performance of the roof to date, and presents some general comments on roof construction in the wintertime.

INCREASING THE EFFECTIVENESS OF SOIL COMPACTION AT BELOW-PREEZING TEM-PERATURES Haas, W.M., et al, Nov. 1978, 58p., ADA-062 875, 57

Alkire, B.D., Kaderabek, T.J.

SOIL COMPACTION, FROZEN GROUND COM-PRESSION, COMPRESSIVE STRENGTH, SOIL WATER, CHEMICAL REACTIONS.

This report presents data from an experimental program undertaken to determine the effect of low temperatures on the compaction characteristics of a sitty sand. The effects of compactive effort and chemical additives were also investigations. of compactive effort and chemical additives were also investigated to determine possible methods of improving the densities of soils placed and compacted at low temperatures. A single soil type was used throughout the test program, and test results were obtained using Standard and Modified AASHO compactive efforts on an untreated soil prepared and tested at temperatures of 20C and -7C. Additional test series, using the same compactive efforts and temperatures, were performed on the soil after it had been treated with an additive. The amounts of additive used, based on the dry weight of soil, were 3, 2, 1, 0.5, and 0.25% of calcium chloride and 0.5% of sodium chloride. From the results of the experimental program, several important conclusions concerning the effect of low temperature compaction were drawn. SR 78-26
FIVE-YEAR PERFORMANCE OF CRREL LAND
TREATMENT TEST CELLS; WATER QUALITY
FLANT YIELDS AND NUTRIENT UPTAKE.

Jenkins, T.F., et al, Nov. 1978, 24p., ADA-086 172, 6 Palazzo, A.J., Schumacher, P.W., Keller, D.B., Gra-ham, J.M., Quarry, S.T., Hare, H.E., Bayer, J.J., Poley, Palazzo,

RS

34-3449 LAND RECLAMATION, WASTE TREATMENT, WATER TREATMENT, WASTE DISPOSAL.

WATEK TREATMENT, WASTE DISTURAL.
The performance of the six land treatment cells is summarized over a five-year period from June 1937 through May 1978. The data presented include quality and volume of watewater applied and percolate resulting from application of primary and secondary wastewater by spray irrigation. Mass loadings and removals are presented as well as crop production and nutrient uptake. Nutrient balance sheets are shown which demonstrate the percentage of nitrogen and phosphorus that is attributed to crop uptake and leachate over this period.

CONSTRUCTION AND PERFORMANCE OF PLATINUM PROBES FOR MEASUREMENT OF REDOX POTENTIAL

REDOX POTENTIAL.
Blake, B.J., et al, Nov. 1978, 8p., ADA-062 426, 2 refs.
Brockett, B.E., Iskandar, I.K. 33-1596

SOIL WATER, PROBES, MEASURING INSTRU-

A simple method is described for construction and testing of platinum oxidation-reduction probes in the laboratory. The probes are "blacked" with platinic chloride to increase their lifetime. Methods of standardization and problems encountered are discussed.

WASTEWATER STABILIZATION POND LIN-

Middlebrooks, E.J., et al, Nov. 1978, 116p., ADA-062 903, Refs. p.63-66. Perman, C.D., Dunn, I.S.

33-2524 WASTE DISPOSAL, WATER TREATMENT, STA-BILIZATION, PONDS, LININGS, SEALING,

SEEPAGE.

A review of the literature on wastewater stabilization lagoon linings, covering the work during the past 20 years, is presented. Design, operating and maintenance experiences are presented for soil sealants, natural sealants, bentonite clays, chemical treatments, gunite, concrete, asphaltic compounds, plastics and elastomers.

The characteristics of various materials, applicability to different wastes, construction techniques and details of installation techniques are presented. Installation costs for various materials and comparative costs are summarized. A summary of reported seepage rates for various types of lining materials is presented. A survey of the States was conducted to determine the requirements for interest and allowable seepage rates. Requirements are varied and depend upon the local soil conditions and the experiences of the regulatory agencies with various materials. The and depend upon the local soil conditions and the experiences of the regulatory agencies with various materials. The trend is toward more stringent requirements. Accepted design and installation procedures are summarized, and detailed drawings of installation techniques are presented. Recomresedations of the manufacturers and installers of liners are also presented.

SR 78-29 SUMMARY OF CORPS OF ENGINEERS RE-SEARCH ON ROOF MOISTURE DETECTION AND THE THERMAL RESISTANCE OF WET INSULATION.

Tobiasson, W., et al, Dec. 1978, 6p., ADA-063 144, 12

Korhonen, C. 33-2525

ROOFS, MOISTURE TRANSFER, DETECTION, INFRARED SPECTROSCOPY.

INFRARED SPECTROSCOPY.

Nuclear, infrared, capacitance, microwave and impulse radar methods for nondestructively detecting moisture in roots were evaluated. No system was reliable enough by itself or by cross-checking with another system to eliminate the need for a few core samples of membrane and insulation to verify findings. Airborne infrared surveys are a cost-effective way of reconnoistering numerous roofs at a major installation. However, follow-up on-the-roof surveys are necessary. Of the several prid techniques examined, nuclear surveys were the most reliable. Hand-held infrared surveys are the most accurate on-the-roof method studied. Although infrared camera costs significantly more than a nuclear meter (\$27,000 vs \$3,000), infrared surveys can be conducted more rapidly. Where numerous roofs are to be surveyed, infrared surveys appear to be the most cost-effective method. In-situ measurements have been made of the thermal resistance of wet and dry portions of roofs. A laboratory apparatus has been built to subject 12 in x 12 in specimens of roof insulation to combined thermal and moisture gradients. Thermal resistance and moisture content are periodically determined, and characteristic curves are being developed for various roof insulations.

SR 78-30

GROWTH RATES AND CHARACTERISTICS OF ICE ON THE OTTAUQUECHEE AND WINOOS-KI RIVERS OF VERMONT DURING WINTER 1977.72

Deck, D.S., Dec. 1978, 30p., ADA-063 874. 34-1107

RIVER ICE, ICE GROWTH, ICE COVER THICK-NESS, FRAZIL ICE.

Ice thickness, growth rates and characteristics of river ice are tabulated for use with a planned physical hydraulic model of the Ottauquechee River in Quechee, Vermont, using real

SR 79-01

INFRARED THERMOGRAPHY OF BUILDINGS A BIBLIOGRAPHY WITH ABSTRACTS

Marshall, S.J., Feb. 1979, 67p., ADA-068 682.

Marshall, S.J., Feb. 1977, 079, ADALOGO COL.

33-3429
BIBLIOGRAPHIES, INFRARED RADIATION,
BUILDINGS, HEAT LOSS, MOISTURE.
This report contains annotated abstracts of over 100 reports
(66 more than the 1977 edition) on the new, but rapidly
expanding subject of infrared thermography of buildings.
The references cover remote sensing airborne surveys of large numbers of buildings, close-up ground surveys of individual buildings, and qualitative (speculative) and semi-quantitative
(ground-truth) field surveys. The report presents examples of themographic energy audits, roof moisture surveys, building retroft surveys, solar panel analysis, window essessments, and other practical applications by government agencies and private sector survey teams. It lists research and development efforts to provide fundamental information to improve quantification accuracy, evaluate equipment, and develop interpretation standards, along with examples of daily usage in contract specifications, public awareness programs, and product testing.

SP 79.02

LANDSAT DATA COLLECTION PLATFORM AT DEVIL CANYON SITE UPPER SUSITIVA BA-SIN, ALASKA—PERFORMANCE AND ANAL-YSIS OF DATA

Haugen, R.K., et al, Feb. 1979, 17 refs., ADA-068 508, 7 refs.

Tuinstra, R.L., Slaughter, C.W.

33-3649

DATA TRANSMISSION, REMOTE SENSING, LANDSAT.

In October 1974, a Landsat Data Collection Platform was installed near the prospective Devil Canyon damsite on the Susitna River, south central Alaska. The development of sensor interfaces and characteristics of transmitted data or sensor mersices and characteristics of transmitted data for air and ground surface temperature, windspeed and wind run, water equivalent snow accumulation, and battery voltage are discussed. Temperature data are analyzed statistically and compared with data from surrounding National Weather Service stations. Although some difficulties were encountered in operation during the winter of 1974-75, it was demonstrated that the Landsat data collection system could provide useful environmental data from a remote, subarctic location in the winter on a near-real-time basis. SP 70-03

COMMUNICATION IN THE WORK PLACE: AN ECOLOGICAL PERSPECTIVE.
Ledbetter, C.B., Feb. 1979, 19p., ADA-066 322, 30

33,2077

COLD WEATHER CONSTRUCTION, DATA TRANSMISSION, HUMAN FACTORS, ENVI-RONMENTS

RONMENTS.

Patterns of communication and social interaction within a work organization are significantly influenced by architecture. Nearly all work organizations are dependent upon information flow, both informal and formal, between coworkers. As a rule, the more open and informal the communication, the more productively and efficiently the organization operates. The architectural design concept of focal points is presented as a strategy for planning the work facility for improved informal communication. Examples of energy-efficient building design schemes for cold regions are presented. These prototype buildings combine design for improved worker efficiency with thermal efficiency.

PRELIMINARY INVESTIGATIONS OF THE KINETICS OF NITROGEN TRANSFORMATION AND NITROSAMINE FORMATION IN LAND TREATMENT OF WASTEWATER.

Jacobson, S., et al, Mar. 1979, 59p., ADA-086 169, 94 refa

Alexander, M. 34-3231

WASTE DISPOSAL, WATER TREATMENT, SOIL CHEMISTRY, LABORATORY TECHNIQUES.

CHBMISTRY, LABORATORY TECHNIQUES.
In laboratory experiments, denitrification of nitrate in wastewater proceeded slowly in an acid soil (pH 4.2), but the rate was fast in soils with pH values of 5.5 to 6.8. The rate of denitrification was governed by the carbon source added, with glucose supporting the fastest rate. The rate was somewhat slower with methanol and succinate and was appreciably slower with secondary effluents as the source of supplemental carbon. Charlton loam supported the more

rapid denitrification with glucose as a carbon source, but the rate was higher in Windsor sandy loam with sewage as the carbon source. Denitrification in these soils did not occur at IC, and the rate increased with rising temperatures.

SR 79-05 PHYSICAL AND THERMAL DISTURBANCE AND PROTECTION OF PERMAPROST, Brown, J., et al, Mar. 1979, 42p., ADA-069 405, Nu-

Grave, N.A.

33-3830

PERMAPROST PRESERVATION, THERMAL STRESSES, HUMAN FACTORS, PERMAPROST DISTRIBUTION, DAMAGE.

DISTRIBUTION, DAMAGE.

This report is based on a review paper presented at the Third International Conference on Permafrost held in July 1978 at Edmonton, Canada. It reviews the literature covering 1974-1978 and covers subjects related to natural and human induced disturbance of terrain underlain by pprmafrost. Subjects include investigations undertaken in conjunction with oil and gas pipelines, terrain mapping, methods for estimating terrain sensitivity, methods of protecting terrain, and the thermal effects of off road transportation, oil spills, fire, removal of the surface soil layers, anow conditions, mining and other construction practices. Methods of protecting and restoring permafrost in the USSR are presented in tabular form. An appendix summarizes results of modeling and microclimatic investigation, and the distribution and properties of subsea, land-based, and alpine permafrost.

SPRAY APPLICATION OF WASTEWATER EF-FLUENT IN WEST DOVER, VERMONT: AN INI-TIAL ASSESSMENT.

Cassell, E.A., et al, Apr. 1979, 38p., ADA-068 534, 26

Meals, D.W., Bouzoun, J.R. 33-3862

WASTE DISPOSAL, WATER TREATMENT, SOIL CHEMISTRY, WATER CHEMISTRY.

Runoff from spray application of secondary wasten a forested hillside in West Dover, Vermont, Runoff from spray application of secondary wastewater effluent on a forested hilliside in West Dover, Vermont, was monitored for a six-week period (11 July-19 August 1977). Both quantity and quality of applied effluent and site drainage were monitored. On-site groundwater and two adjacent streams were sampled for water quality. Drainage flows were relatively constant during the study period in spite of highly variable inputs to the site. There is evidence that substantial quantities of water may be leaving the spray site by moving through the subsurface fraginen layer. On a mass basis, 95% of the total nitrogen, 96% of the ammonia nitrogen, 92% of the total phosphorus, and 79% of the ODDS were removed by spray application. Heavy precipitation was observed to flush most nutrient forms, especially nitrate-nitrogen, from the spray site. Groundwater on the spray field contained lower concentrations of nutrient than did the applied effluent, but higher concentrations than those found in site drainage.

No leavandors of nutrient were detected during the study period. However, there was some evidence of increased chloride concentrations in Ellis Brook.

SR 79-07 ENERGY REQUIREMENTS FOR SMALL FLOW VASTEWATER TREATMENT SYSTEMS Middlebrooks, B.J., et al, Apr. 1979, 82p., ADA-070 676, 16 refs. Middlebrooks, C.H.

MiddleBrooks, Call.
33-4225
WASTE DISPOSAL, WASTE TREATMENT,
PONDS, SEEPAGE, SEEPAGE, COST ANAL-

This report summarizes energy requirements for small wastewater treatment systems (0.05 - 5 million gallons per day) applicable to military installations. It compares various treatment combinations and manufacture of the compares of the compares of the compares various treatment combinations. applicable to military installations. It compares various treatment combinations, and presents the energy requirements for the most viable alternatives in tabular form. It also presents energy requirements for various components of waterwater treatment systems in a format making it convenient to calculate the energy requirements for many combinations of the components. In addition, it summarizes briefly energy estimates made by others. The report compares typical combinations of unit operations and processes used to produce various quality effluents on the basis of energy consumption. It concludes that land application systems are the most energy-efficient wastewater treatment systems and that they are capable of producing an equivalent or higher quality effluent than any other treatment system.

SR 79-08 **DESIGN PROCEDURES FOR UNDERGROUND**

HEAT SINK SYSTEMS.
Stubstad, J.M., et al, Apr. 1979, 186p. in var. pagna., ADA-068 926, 65 refs.
Quinn, W.F., Greenberg, M., Beat, W.C., Botros,

33-3427 UNDERGROUND FACILITIES, HEAT TRANS-FER, WASTE DISPOSAL, HEAT RECOVERY, HEAT SINKS.

This report presents criteria, engineering information and estimation procedures for the disposal of waste heat associated with the generation of power required to supply the needs of hardened defense underground installations. The major emphasis is placed on the temporary disposal of waste heat below ground while the installation is under attack and cannot rely upon aboveground disposal. A series of sample problems is included to illustrate the use of the estimation procedures presented in the report. All of the sample problems are based on the sizing of a heat sink system for an underground nuclear power plant. Under the design criteria which were assumed for the sample problems, it is shown that the combination ice/water type heat sink concepts provide the most cost effective solutions.

SR 79-09 ESTIMATED SNOW, ICE, AND RAIN LOAD PRIOR TO THE COLLAPSE OF THE HART-FORD CIVIC CENTER ARENA ROOF. Redfield, R., et al, Apr. 1979, 32p., ADA-069 323, 19

son, W., Colbeck, S.C. 33-4673

ROOPS, LOADS (FORCES), SNOW LOADS, ICE LOADS, RAIN.

LOADS, RAIN.

The roof of the Hartford, Connecticut, Civic Center Arena collapsed under an unknown load of snow, ice and rain early in the morning on Isn. 18, 1978. Based on available meteorological and snow load measurements, estimates for the amount of load present at the time of failure are made using a number of techniques. In addition, previous maximum loads due to snow, ice or rain since the building was constructed are also estimated.

SR 79-10

RAPID DETECTION OF WATER SOURCES IN COLD REGIONS—A SELECTED BIBLIOGRA-PHY OF POTENTIAL TECHNIQUES.

Smith, D.W., comp, May 1979, 75p., ADA-070 030. Smith, G.A., comp, Brown, J.M., comp, Schraeder, R.L., comp, Kosikowski, L., comp.

BIBLIOGRAPHIES, GROUND WATER, WATER SUPPLY, DETECTION, ELECTRICAL RESIS-

A review of current literature on existing techniques that could be utilized in the rapid location of water sources for field camp use in permafrost regions resulted in the selection of three non-ground contact methods of electrical resistivity and two radar methods as being the most effective techniques.

The search included thousands of references; 77 of these were chosen to be included in the annotated bibliography. The interest level or pertinence of each entry to the study is indicated, and keywords are provided. The keyword index contains all keywords for all entries listed in alphabetical order.

SEEKING LOW ICE ADHESION.
Sayward, J.M., Apr. 1979, 83p., ADA-071 040, 54 33-4226

33-4226 ICE ADHESION, ADHESIVE STRENGTH, ICE PREVENTION, ICE SOLID INTERFACE, WETTABILITY, COHESION, POLYMERS, ICE REMOVAL, SURFACE PROPERTIES, SURFACE ENERGY.

MOVAL, SURFACE PROPERTIES, SURFACE ENERGY.

Icing impairs operation of helicopters and other aircraft, antennae, power and communication lines, shipping and superstructures, canal locks, etc. Prevention or easier removal of icing requires reduction of its adhesion strength. Literature study shows that adhesion results from secondary (van der Wasis) forces yet exceeds normal cohesive strengths. It depends on free surface energy, low contact angle, good contact and wetting, cleanliness, and texture. Modes of adhesion testing are briefly discussed. Poor adhesion occurs with low energy surfaces or contaminants, e.g. hydrocarbons, fluorocarbona, waxes, oils, etc., particularly when textured or porous. The resulting low contact angle, poor wetting and occlusion of air at the interface weaken the bond or provide stress loci which can initiate cracks and failure. Coefficient of expansion differences may help in release of ice. Further ideas appear among the 100 abstracts presented. A survey of over 300 manufacturers produced over 100 replies. Half of them offered some 100 products deemed worth testing. These are listed with addresses and contacts. Besides simple resins and other release agents, they include composities which combine low surface energy and stronger materials as micro-mixture, interpeneerating-network, "plastic-alloy," or filler-matrix systems. About 15 to 20 products appear of special interest. Samples of liquid coating or supplier-prepared panels of many are available for the testing phase to follow.

SR 79-12

FREEZING PROBLEMS ASSOCIATED WITH SPRAY IRRIGATION OF WASTEWATER DUR-ING THE WINTER.

Bouzoun, J.R., May 1979, 12p., ADA-070 031, 5 refs. 34-136

WASTE TREATMENT, WATER TREATMENT, WASTE DISPOSAL, IRRIGATION, ICE PREVEN-TION.

During the winters of 1975-76, 1976-77 and 1977-78, biologically treated wastewater was applied to land in West Dover,

Vermont. The wastewater was applied using the spray irrigation method at ambient temperatures as low as 0F. During the first winter, freezing was a major problem. Modified spray nozzles that were less susceptible to freezing were installed at both the low points and high points of the aboveground spray laterals. During the second and third winters, ice buildup along the spray laterals, particularly in the vicinity of the spray nozzles, caused serious damage to the rives. Many membeurs were required to cut the in the vicinity of the spray nozzles, caused serious damage to the pipes. Many man-hours were required to cut the ice repeatedly from the laterals. As an experiment to alleviste the problem, several 30- to 36-in risers were installed at an angle of approximately 30 degrees from the vertical on two of the spray laterals during the winter of 1977-78. They functioned well enough to warrant future installation on the entire system of spray laterals.

SR 79-13 PHOTOELASTIC INSTRUMENTATION— PRINCIPLES AND TECHNIQUES. Roberts, A., et al, May 1979, 153p., ADA-072 011, 83

Hawkes, I.

MEASURING INSTRUMENTS, OPTICAL PROP-ERTIES, STRESSES, ELASTIC PROPERTIES, IN-DICATING INSTRUMENTS, PHOTOELASTICI-

TY.

This report contains a detailed review of the theory and design of photoelastic transducers for measuring loads, strains, stresses and pressures. The measurement of engineering parameters under the adverse conditions normally encountered in the mining and civil engineering industries presents great problems, particularly where such measurements are to be made over long periods of time. Photoelastic transducers have distinct advantages over competing equipment in this respect in that the parameters to be measured are revealed as light interference fringes, and the measuring gage itself often need consist of nothing more than simple steel and glass components. Examples of such gages are given in the report. The majority of the work reported here was carried out by the staff and students of the Postgraduate School of Mining, Sheffield University.

ELECTROMAGNETIC GEOPHYSICAL SURVEY AT AN INTERIOR ALASKA PERMAFROST EX-

Sellmann, P.V., et al, May 1979, 7p., ADA-071 065, 5 refa.

Delaney, A.J., Arcone, S.A. 33-4227

33-4227
PERMA/ROST PHYSICS, PERMAFROST
STRUCTURE, GROUND ICE, ICE WEDGES,
SOIL STRENGTH, ELECTROMAGNETIC PROSPECTING, GEOPHYSICAL SURVEYS, SEASON-AL FRERZE THAW.

AL PREEZE THAW.

Road construction activity near Fairbanks, Alasks, in the late full of 1977, revealed a large exposure of Fairbanks silt containing numerous massive ice features. These exposures are typical of those found in this region. Thaw, during the summer of 1978, caused the upper loo-rich sections to retreat several metera. Goophysical techniques were utilized over these exposures to determine if resistive anomalies of ice wedge dimension could be detected. Magnetic induction measurements at three intercoil spacings and low-frequency surface immediance measurements were made about induction measurements at times intercoil spacings and sow-frequency surface impedance measurements were made about 6 m from the edge of each exposure in April 1978 before thaw commenced. The results agree well with observations of the layering, but most individual anomalies are difficult to interpret because the lateral extent of the ice is unknown.

SR 79-15

IMPROVED DRAINAGE AND FROST ACTION CRITERIA FOR NEW JERSEY PAVEMENT DE-SIGN. PHASE 2 (DATA ANALYSIS). Berg, R.L., May 1979, 51p., ADA-071 041, 7 refs. 33-4228

FROST PENETRATION, SUBSURFACE DRAIN-AGE, MOISTURE, FREEZING INDEXES, PAVE-MENTS.

MENTS.

Before constructing actual highway pavements with open-graded drainage layers, frost penetration depths and moisture content profiles were measured beneath several pavements in New Jersey. Air and surface freezing indexes were measured at three locations during the 1975-1976 and 1976-1977 winters. All freezing indexes were considerably greater during the 1976-1977 winter. The modified Berggren equation was used to compute the maximum frost depth at 30 test sites. Measured maximum frost depths ranged from 20.5 in. to 52.0 in., while computed maximum values ranged from 14.0 in to 61.0 in. The mean difference between observed and computed maximum frost penetration depths was 3.8 in. Maximum frost penetration depths were computed for hypothetical pavements with open-graded drainage at four of the test sites. It was concluded that open-graded drainage layers would not significantly change the frost penetration beneath highway pavements in New Jersey. It was recommended that test pavements be installed to verify the computations. Jersey. It was recommendations.

SR 79-16

ROOF MOISTURE SURVEY-U.S. MILITARY

ACADEMY. Korhonen, C., et al, May 1979, 8 refs. Tobiasson, W.

33-4229

ROOFS, WALLS, LEAKAGE, INSULATION, MOISTURE, INFRARED EQUIPMENT, MEASURING INSTRUMENTS.

SURING INSTRUMENTS.

The roofs and upper story walls of buildings 745E, 752, and 756 at the U.S. Military Academy, West Point, New York, were surveyed with a hand-held infrared camers to locate sources of reported wall leaks. An electrical resistance probe was used to determine the relative level of moisture in wall components. Several 3-in-dism core samples of each roof were obtained to verify suspected moisture conditions and to examine the roof membrane in cross section. Wet areas on each roof were outlined with white spray peint. Wall leaks are believed to becaused by wind-driven rain entering the parapet walls in locations where the decorative glazo-cost has spalled off. Recommendations for maintenance of these buildings are based on information derived from the infrared survey, electric resistance readings, core samples and visual examinations.

SR 79-17

SMALL-SCALE TESTING OF SOILS FOR FROST ACTION AND WATER MIGRATION. Sayward, J.M., May 1979, 17 p., ADA-071 989, 25

33-4435
SOIL TESTS, FROST ACTION, SOIL WATER MIGRATION, FROST HEAVE, ICE NEEDLES.

GRATION, FROST HEAVE, ICE NEEDLES.

A method is described by which frost action (soil beaving and and needle ice) and the use of soil additives for its control can be studied. The apparatus and procedure are simple and convenient, requiring no extensive space or services and using only small quantities of materials. The procedure could be useful in developing a standard test for such purposes where small scale and convenience are requisite. Also described are two simple, small-scale accessory tests that likewise relate to permeability of soils. These evaporation and wetting tests might also have similar use, particularly in the study of water migration-inhibiting additives.

SR 79-18

EVALUATION OF NITRIFICATION INHIBI-TORS IN COLD REGIONS LAND TREATMENT OF WASTEWATER: PART 1. NITRAPYRIN. Elgawhary, S.M., et al, May 1979, 25p., ADA-071 077, 21 refs.

Iskandar, I.K., Blake, B.J.

33-4230

WASTE TREATMENT, WATER TREATMENT, SOIL MICROBIOLOGY, LAND RECLAMA-TION, ARCTIC REGIONS.

SOIL MICROBIOLOGY, LAND RECLAMATION, ARCTIC REGIONS.

A series of laboratory and field tests was conducted to investigate the possibility that nitrapyrin could be useful as a nitrification inhibitor in land treatment of wastewater. Laboratory tests included soil incubation and soil column studies. Variables were soil type, temperature, nitrapyrin concentration and method of application to the soil. Experimental designs included two soils, three temperatures (0, 10 and 20°C) and three levels of inhibitors in a complete factorial. Forage grasses were present in all treatments, and wastewater containing NH4+ was utilized. Weekly application of wastewater was 5 cm. Soil solution at depth and leachate at 160 cm were collected and analyzed weekly for NH4N and NO3N. That data indicate that nitrapyrin was not effective in inhibiting nitrification when applied to the soil surface in soil columns simulating land treatment slow infiltration. The ineffectiveness of the compound under a mode of application where it is mixed and sprayed with wastewater is thought to be due to its volatility, sorption by organic matter, low water solubility and its immobility in soils. Other chemicals such as carbon disulfide and thiocarbonates, which have different characteristics than the nitrapyrin, showed promising results. Research is under way to obtain conclusive data.

SR 79-19 DRAINAGE NETWORK ANALYSIS OF A SUBARCTIC WATERSHED: CARIBOU-POKER CREEKS RESEARCH WATERSHED, INTERIOR AT.ASKA.

Bredthauer, S.R., et al, June 1979, 9p., ADA-073 595, 14 refs.

Hoch. D.

WATERSHEDS. DRAINAGE, SLOPE PRO-CESSES, PERMAPROST.

CESSES, PERMAPROST.

A Strahler stream order analysis and an exterior link length distribution analysis were made of the Caribou-Poker Creeks Research Watershed near Pairbanks Alaska. The drainage network map used for analysis was produced using a 1:2250 scale aerial photograph measic. Low drainage densities characterize the basins. Bifurcation ratios indicate that the overall drainage network is not dominated by strong geologic controls. Statistical analysis indicates that bifurcating source links and tributary source links do not belong to the same length population, a characteristic abared by watersheds in other climatic regions of the world. Additional analysis indicates that exterior links originating on permafrost

slopes tend to be shorter than those originating on non-permafrost, well-drained slopes.

INFRARED THERMOGRAPHY OF BUILD-INGS: 1977 COAST GUARD SURVEY.

Marshall, S.J., June 1979, 40p., ADA-073 596, 9 refs. 34-138

BUILDINGS, HEAT LOSS, INFRARED PHO-TOGRAPHY, WINDOWS.

An IRTB (infrared thermography of buildings) field survey, producing 631 thermograms, 127 photographs, and weather data, was conducted during a 14-day study of 10 Coast Guard stations in Maine, New Hampshire and Massachusetts. This report discusses how the survey was initiated and per-formed with emphasis on details for the benefit of the reader formed with emphasis on details for the benefit of the reader wishing to plan a survey. One hundred twenty selected thermograms and photographs in this report illustrate many types of heat loss and compare thermally ineffective doors and windows with units designated as standards for thermal effectiveness. Radiator heat leakage through walls, mottled moisture patterns on brick walls, infiltration patterns on glass, and poorly covered openings are illustrated. Thermograms of severe heat loses through glass doors, glass transoms, and glass wall panels are also included, and several solutions for individual heat loss problems, such as fiberglass garage doors and porcelain insulated panels, are suggested. Unanticipated survey problems, such as difficulties in obtaining photographs to compare with thermographically discovered artifacts and adjustments to survey techniques for inclement weather, are also discussed.

SE 79-21

SP 79-21

ICEBERGS: AN OVERVIEW.

Kovacs, A., July 1979, 7p., ADA-078 692, 9 refs.

ICEBERGS, CLASSIFICATIONS.

Icebergs are discussed and categorized according to their size, shape, composition and color. A general overview of iceberg-producing areas in the Arctic and Antarctic is given, and their drift and deterioration are discussed. (Auth.)

DETERMINATION OF PROST PENETRATION BY SOIL RESISTIVITY MEASUREMENTS.

Atkins, R.T., July 1979, 24p., ADA-071 990.

MEASURING INSTRUMENTS, FROST PENE-TRATION, ELECTRICAL RESISTIVITY, FROZ-EN GROUND PHYSICS.

Two sensors that depend on changes in soil resistivity were tested. Tests were conducted under a parking area with an asphalt-concrete surface where sait was periodically applied as near of annu removal operations. For comparison. an asphalt-concrete surface where salt was periodically applied as part of snow removal operations. For comparison, data were obtained from a resistivity probe, a thermocouple probe and a thermistor probe. Results indicated that measurement properature to determine frost penetration can lead to large errors under some conditions, for instance when salt has been applied or when frost is coming out of the ground in spring. The resistivity probe performed reliably during the entire measurement program. It was concluded that resistivity probes have definite advantages which should be considered when future frost penetration measurement programs are designed. grams are designed.

SR 79-23

DOCUMENTATION OF SOIL CHARACTERIS-TICS AND CLIMATOLOGY DURING FIVE YEARS OF WASTEWATER APPLICATION TO CRREL TEST CELLS.

Iskandar, I.K., et al, July 1979, 82p., ADA-074 712, 14

Quarry, S.T., Bates, R.E., Ingersoll, J.

WASTE DISPOSAL, WATER TREATMENT, SOIL CHEMISTRY, CLIMATOLOGY, METEORO-LOGICAL DATA.

LOGICAL DATA.

Section 1 deals with physical properties of the two soils used and the changes in soil chemical characteristics. The physical properties of the soil are those most important in controlling the rate of water movement in soils, such as saturated and unsaturated soil hydraulic conductivity, particle size distribution, bulk density, void ratio, available water and specific gravity. The chemical characteristics of the soil that are of potential importance in assessing the short and long-term effects of wastewater application on land include: free iron oxidea, organic carbon, organic nitrogen, pH, conductivity, cation exchange capacity, exchangeable cations, total and extractable phosphorus, and total and extractable heavy metals. Section 2 summarizes climatic conditions at the CRREL site in Hanover, New Hampshire, and the changes that occurred during the period 1974 to 1978. Climatic parameters include temperature, precipitation, wind speed, and soil temperature at depth.

DETERMINATION OF DISSOLVED NITRO-GEN AND OXYGEN IN WATER BY HEADS-PACE GAS CHROMATOGRAPHY. Leggett, D.C., July 1979, 5p., ADA-074 411, 25 refs. 34-744

LAKE WATER, WATER CHEMISTRY. In this study dissolved oxygen and nitrogen were determined by shaking 20 to 25 ml of water with an equal amount of helium in a 50-ml gas-tight syrings and injecting 2 ml of the equilibrated headgas into a gas chromatograph. Oxygen and nitrogen were separated on a 5-A molecular sieve column at ambient temperature and detected with a hot wire detector, using atmospheric air for calibration. Advantages of this method over previously reported methods are 1) oxygen and nitrogen are determined in a single analysis, 2) no specifically fabricated stripping apparatus is needed, and 3) analysis can be done in the field with completely portable, battery-operated equipment. The method appears to be accurate and reproducible; several lake O2 and N2 profiles were obtained using this technique.

SR 79-25 BULLET PENETRATION IN SNOW.

Cole, D.M., et al, July 1979, 23p., ADA-074 412, 14

Farrell, D.R.

SNOW (CONSTRUCTION MATERIAL), PRO-JECTILE PENETRATION, PENETRATION TESTS.

TESTS.

Three types of ammunition, the M193, M80, and M43, were tested. Rounds were fired into snow targets of various thicknesses up to that thickness required to fully stop the projectiles. The maximum penetrations for the three rounds tested were 0.70 m, 1.26 m and 1.06 m, respectively. Velocity loss as a function of target thickness was determined by measuring projectile velocity before and after impact of the projectile with the target. The velocity loss vs. thickness data showed a sigmoid shape common to the three types of rounds. The impact and exit yaw angles of the M193 rounds were estimated. Scatter in the test data was attributed, in part, to random variations in the impact yaw angle. The penetration required for a 90 deg yaw was determined by the exit yaw measurements. This was shown to correspond to the inflection point on the velocity loss vs. penetration curve. This point is potentially significant in the design of composite fortifications. Discussions deal with basic concepts and definitions, the occurrence and significance of projectile tumbling and the use of laboratory tests for small arms evaluation in snow targets. The validity of the methodology used was established by testing M193 rounds in galatin targets. These results compared favorably with similar test results in literature. SR 79-26

APPLICATION OF HEAT PIPES ON THE TRANS-ALASKA PIPELINE. Heuer, C.E., July 1979, 27p., ADA-073 597, 26 refs.

PIPELINES, HEAT PIPES, HEAT TRANSFER PIPELINES, HEAT PIPES, HEAT TRANSFER.

The application of heat pipes on the Trans-Alaska Pipeline is reviewed. The subjects addressed include the general functioning of a heat pipe, the specific heat pipe design used, the different situations where heat pipes were employed, the methods used to develop the heat pipe design, the methods used to monitor the operating heat pipes, and the performance of the heat pipes. The discussion is qualitative in nature. Quantitative information is largely omitted to allow coverage of a broad area and because it may be considered proprietary. Nevertheless, the information presented here should give a good appreciation of the quality and complexity of the heat pipe design. The information should also be useful in developing heat pipes for use in other cold regions applications. other cold regions applications

SR 79-27 EXTENDING THE USEFUL LIFE OF DYE-2 TO 1986, PART 1: PRELIMINARY FINDINGS AND RECOMMENDATIONS.

Tobiasson, W., et al, July 1979, 15p., ADA-074 733, 3 refs.

Korhonen, C., Redfield, R.

34-745 COLD WEATHER COLD WEATHER CONSTRUCTION, SHEETS, STEEL STRUCTURES, STRESSES. SHEBTS, STEBL STRUCTURES, STRESSES.

DEW Line Ice Cap Station DYE-2 appears to need major work within the next few years to extend its useful life to 1986. In structural steel frame is overstressed in a few areas, and the lower portion of the subsurface timber truss enclosure is in bad condition. Additional performance measurements are needed during 1979 to determine the rate of secondary stress in the structural steel frame and the rate of deterioration of the truss enclosure. With this information, a decision can be made whether to move the building stidways onto a new undistorted foundation to stabilize it in-place by encapsulating the lower 52 ft of the substructure in ice.

SR 79-28 UTILIZATION OF SEWAGE SLUDGE FOR TER-RAIN STABILIZATION IN COLD REGIONS.

Gaskin, D.A., et al, Aug. 1979, 36p., ADA-074 725, 10 refs. For Part 1 see 32-1368.
Palazzo, A.J., Rindge, S.D., Bates, R.E., Stanley, L.E.

34-746 SLUDGES, SEWAGE DISPOSAL, SOIL STABILI-ZATION, VEGETATION.

ZATION, VEGETATION, Prom June 1975 to Sep. 1976, a research/demonstration study was conducted at CRREL in Hanover, New Hampshire, to investigate the use of sewage sludge, commercial fertilizer and cultivation techniques for terrain stabilization in cold regions. Twenty-seven test plots on a 16-deg west-facing slope received various combinations of: 1) surface preparation (tilling, bulldozer tracking, or compacting), 2) nutrient source (sewage sludge or fertilizer), 3) mulching agent (wood fiber

mulch or peat moss), and 4) tacking agent (Terra Tack III or Curssol). The plots were seeded in either the spring or fall with a constant seed mixture. The effectiveness of the treatments was determined through vegetation yields and soil loss measurements.

SR 79-29

MASS WATER BALANCE DURING SPRAY IR-RIGATION WITH WASTEWATER AT DEER CREEK LAKE LAND TREATMENT SITE.

Abele, G., et al, Aug. 1979, 43p., ADA-080 649, 3 refs. McKim, H.L., Brockett, B.B. 34-2284

WATER TREATMENT, WASTE TREATMENT, WATER BALANCE, SEWAGE TREATMENT, IR-

The water budget for a 3.6-ha test area was calculated during and two days after a 2.7-cm (equivalent to 991,000 I) application of wastewater. By computing the water remaining in the soil from soil sample water content data, calculating the amount lost to evapotranspiration and measuring the underdrain flow rate, it was possible to calculate the water budget to within 95% of the actual amount applied. The accuracy in computing the soil water content is critical The accuracy in computing the soil water content is critical. In this case, a 1% variation of error in the volumetric water content is equivalent to nearly one third of the total water applied.

TUNDRA LAKES AS A SOURCE OF FRESH WATER: KIPNUK, ALASKA.
Bredthauer, S.R., et al, Sep. 1979, 16p., ADA-075 475,

12 refs.

Doerflinger, D.F.

LAKE WATER, TUNDRA, SNOWMELT, WATER SUPPLY, ARCTIC REGIONS.

SUPPLY, ARCITC REGIONS.

A study of water quality in several small tundra lakes near Kipnuk, Alaska, was conducted to determine if the lakes were of sufficiently high quality during the snowmelt season to provide the village with enough water for a year-round supply. Since the village is located just 4 miles inland from the Bering Sea, primary emphasis was placed on locating water sources with low chloride concentrations. The tundra lakes were of sufficiently high quality to be pumped into a storage area during early summer to be used as a year-round supply. round supply.

USE OF 15N TO STUDY NITROGEN TRANS-FORMATIONS IN LAND TREATMENT.

Jenkins, T.F., et al, Sep. 1979, 32p., ADA-077 583. Quarry, S.T., Iskandar, I.K., Edwards, A.P., Hare, H.E.

WASTE DISPOSAL, WATER TREATMENT, IR-RIGATION, SOIL CHEMISTRY.

RIGATION, SOIL CHEMISTRY.

The objective of this study was to compare different strategies of using 15N as a tracer to describe the fate of wastewater. N in land application of wastewater. Four soil columns were packed with Windsor sandy loam soil and covered with forage grass. The columns were treated with 7.5 cm of either tapwater or wastewater according to four experimental strategies. The strategies varied the treatment given the soil prior to application of the 15N label, the schedule and amounts of the applied 15N label, and the type of water used for subsequent column leaching. Soil solution and 15N content of nitrate and ammonium. Plant samples were obtained periodically throughout the experiment and together with soil samples collected at the end of the experiment, analyzed for total nitrogen content and 15N/14N ratios.

SR 79-32 BACTERIAL AEROSOLS FROM A FIELD SOURCE DURING MULTIPLE-SPRINKLER IR-RIGATION: DEER CREEK LAKE STATE PARK. OHIO

Bausum, H.T., et al, Sep. 1979, 64p., ADA-077 632, 18 refs.

Bates, R.E., McKim, H.L., Schumacher, P.W., Brockett, B.E., Schaub, S.A. 34-1381

WATER TREATMENT, WASTE DISPOSAL, IRRIGATION, AEROSOLS, MICROBIOLOGY.

RIGATION, AEROSOLS, MICROBIOLOGY.

An evaluation of microbiological aerosols resulting from the spray irrigation of wastewater under known atmospheric stability conditions was performed during July and August 1978 at the Deer Creek Lake land treatment system in Ohio. In the experiment, ponded chlorinated wastewater was sprayed onto a 6-acre test area with 96 impact sprinklers representing a multi-source field aerosol distribution system. Approximately 99.9% of the wastewater applied to the 23-hectare test area fell within the area of influence of the sprinkler (about a 20-m diam circle around the sprinkler riser) with only 0.10% of the applied wastewater aerosolized. Indigenous total aerobic bacteria in the wastewater and resultant serosols were sampled and analyzed. Fluorescent dye studies were also performed to characterize the aerosol cloud without the effects of biological decay. During all of the aerosol tests continuous on-site meteorological measurements were made and wastewater chemical parameters monitored.

TEST OF SNOW FORTIFICATIONS.

Farrell, D.R., Oct. 1979, 15p., ADA-078 742, 16 refs.

PENETRATION TESTS, MILITARY ENGINEER-ING, SNOW (CONSTRUCTION MATERIAL), FORTIFICATIONS, SMALL ARMS AMMUNI-TION

TION.

A field study was conducted to 1) more accurately define the degree of protection offered by simple snow fortification and 2) evaluate the effort required by infantry troops to build such fortifications when only basic tools are available. A seven-man infantry squad, equipped with standard issue snow shovels and an arctic sled (Akhio), constructed several simple snow structures. Construction was made more difficult by the imposition of a camouflage discipline requirement. When completed, three positions were subjected to M16Ai rifle fire while the infantry squad executed a simulated tactical facult by the imposition of a camouflage discipline requirement. When completed, three positions were subjected to M16Ai rifle fire while the infantry squad executed a simulated tactical assault. A fourth and much larger position was tested with simulated covering fire from a M2HB 50-caliber machine gun. None of the 5.56-mm bullets fired by the squad from ranges of 200 m to as close as 10 m managed to penetrate the 1.8-m-thick snow embankments. The 12.7-mm-diameter bullets fired from the M2HB at a range of 250 m were all stopped by 3.0 m of packed snow. The camouflage considerations and the shallow snow conditions increased the construction time for the three small emplacement by almost a factor of four, and for the larger emplacement increased the construction time for the three small emplacements by almost a factor of four, and for the larger emplacement by almost a factor of three. But the squad still handled a volume of packed anow that was equal to 3.7 times the volume of unfrozen soil that could be handled with the same amount of effort, according to field manual estimates. Under frozen soil conditions the advantages of using snow would be significantly greater.

SR 79-34

UTILIZATION OF SEWAGE SLUDGE FOR TER-RAIN STABILIZATION IN COLD REGIONS. PT. 3.

Rindge, S.D., et al, Oct. 1979, 33p., ADA-077 585. Gaskin, D.A., Palazzo, A.J.

34-2365

WASTE DISPOSAL, SEWAGE DISPOSAL, SOIL STABILIZATION.

The authors have conducted a two-year revegetation study to assess the ability of sewage sludge applications with or without supplemental fertilizer to promote plant growth and stabilize alongs soils. The study site was a west-facing, 16 deg slope at CRREL in Hanover, New Hampshire. 16 deg alope at CRREL in Hanover, New Hampshire. Bight revegetation treatments and one control were replicated three times. Treatments involved applications of dewatered, anserobically digested sewage sludge at two rates (20 or 40 tom/scre). The sludge was applied alone or in combination with commercial fertilizers which supplied nitrogen, phosphorus and potassium, or all three nutrients. The seed mixture in the treatments contained four grasses and one legume. The effects of the various treatments were determined through soil loss yields, visual grass ratings and plant vields.

SR 79-35

PROTOTYPE OVERLAND FLOW TEST DATA: JUNE 1977-MAY 1978.

Jenkins, T.F., et al, Nov. 1979, 91p., ADA-078 743, 9 refs.

rets. 34-1599 WASTE TREATMENT, WATER TREATMENT, IRRIGATION, SOIL CHEMISTRY, ION EX-CHANGE, METEOROLOGICAL DATA.

A prototype overland flow land treatment system was operated at Hanover, New Hampshire, over a one-year cycle from June 1977 to May 1978. The individual data points collected awar 1971/10 May 1978. In mountaind data points collected over this period for water quantity and quality are presented, as well as plant yields and nutrient uptake. The soil chemical and physical parameters measured are also presented along with a table of initial site characteristics. The meteorological measurements obtained in support of this effort are included to complete the data base.

PROCEEDINGS OF A MEETING ON MODEL-ING OF SNOW COVER RUNOFF, 26-28 SEP-TEMBER 1978, HANOVER, NEW HAMPSHIRE. Colbeck, S.C., ed, Jan 1979, 432p., ADA-167 767, For individual papers see 34-1002 through 34-1040. Nu-merous refs.

Ray, M., ed. 34-1001

MEETINGS, SNOW COVER, RUNOFF, MOD-ELS.

SR 80-01

DISINFECTION OF WASTEWATER BY MI-CROWAVES.

Iskandar, I.K., et al, Jan. 1980, 15p., ADA-082 174, 36

Parker, L.V., Madore, K., Gray, C., Kumai, M. 35-2592

WASTE TREATMENT, WATER TREATMENT, MICROWAVES, BACTERIA.

Results from a laboratory study show that microwave energy can be used for disinfection of wastewater. The time required for destruction of bacteria by microwaves was reduced over that of conventional heating.

Destruction of wastewater

bacteria and a cell-suspension of of *E. Coli B.* was logarithmic after an initial lag phase, which was dependent upon the volume used. Thermophilis *B. stearothermophilus* cells were used to try to determine if the mechanism of destruction

ICEBREAKING CONCEPTS.

Mellor, M., Jan. 1980, 18p., ADA-082 175, 4 refs.

ICE BREAKING, ICEBREAKERS, ICE COVER THICKNESS, PENETRATION, ICE CUTTING, ICE BLASTING, MARINE TRANSPORTATION, OFFSHORE STRUCTURES.

OFFSHORE STRUCTURES.

Icebreaking concepts that have potential application in the protection of offshore stuctures and drillships are reviewed. The concepts dealt with include conventional icebreaking by ships, icebreaking by air cushion vehicles, breaking against fixed structures, mechanical cutting with drag bit tools, blasting by high explosives, blasting with compressed gases or propellants, ice melting, thermal cutting, cutting with liseers, cutting with high pressure water jets, and unproven novel concepts. Special emphasis is given to the specific energy requirements for the various methods.

SIR RALAS

DANISH DEEP DRILL; PROGRESS REPORT: FEBRUARY-MARCH 1979.

Rand, J.H., Jan. 1980, 37p., ADA-082 206.

DRILLING, ICE CORING DRILLS, ICE CORES, GLACIOLOGY, DESIGN, PERFORMANCE, GLACIOLOGY, MAINTENANCE.

MAINTENANCE.

The "Danish Deep Drill" was developed at the University of Copenhagen. The drill, which will be used to obtain ice cores from the Greenland Ice Sheet, was tested at the U.S. Army Cold Regions Research and Engineering Laboratory.

The drill is battery-operated and has a down-hole microprocessor-based control section and a delicately balanced chip removal system. It is a lightweight, electro-mechanical drill designed to obtain a 10.2-cm-dismeter core in 2-m lensths. There are notential problems in chip recovery drill designed to obtain a 10,2-cm-diameter core in 2-m lengths. There are potential problems in chip recovery and storage, malfunctions of the computer or batteries, leaks in the pressure chamber, spin-out or rotation of the drill, and the very close tolerances required by the drill design. Tests are recommended that will help eliminate some of these potential problems and determine the drill's overall strengths and weaknesses. The drill is a very complex and delicate instrument that will require constant maintenance, modification and monitoring when in use.

SR 80-04

EVALUATION OF ICE DEPLECTORS ON THE USCG ICEBREAKER POLAR STAR. Vance, G.P., Jan. 1980, 37p., ADA-082 205. 35-2595

ICEBREAKERS, PROPELLERS. ICE COVER THICKNESS, ICE NAVIGATION.

THICKNESS, IČE NAVIGATION.

Model tests were carried out in the CRREL Ice Engineering Facility test beain on a 1-to-19.1 model of the USCG Polar Star (WAGB-10) to determine the effectiveness of several different devices that would eliminate or mitigate the ingestion of ice into the propeller slip stream. Propeller RPM records and highspeed movies were obtained for each device in two thicknesses of ice and at two speeds. Four devices were evaluated: large bilge keels, small bilge keels, bossing fins and propeller cages (called bird cages). The most effective concept appeared to be the bilge keels. Open water power tests and structural analysis must now be carried out to determine the overall feasibility of these concepts. SR 80-05

COASTAL ENVIRONMENT, BATHYMETRY, AND PHYSICAL OCEANOGRAPHY ALONG THE BEAUFORT, CHUKCHI AND BERING

Gatto, L.W., Jan. 1980, 357p., ADA-084 281, 56 refs.

COASTAL TOPOGRAPHIC FEATURES, BATH-YMETRY, MARINE GEOLOGY, SHORELINE MODIFICATION, OCEANOGRAPHY, ENVI-RONMENTS.

The report compiles references, figures, and tables that are concerned with the coastal environment, bathymetry, and physical oceanography along the Beaufort, Chukchi, and Bering Seas. The text, intentionally minimized, describes the salient points with a minimum of detail. The extensive references and figures give direction to a reader seeking additional information.

POST OCCUPANCY EVALUATION OF A PLANNED COMMUNITY IN ARCTIC CANADA. Bechtel, R.B., et al, Feb. 1980, 27p., ADA-082 162, 4 refs.

Ledbetter, C.B.

35-2596 URBAN PLANNING, HOUSES, SITE SURVEYS, BUILDINGS, ECOLOGY.

This report describes a post-occupancy evaluation of a small mining community in the high Arctic. Providing superior housing, having wives work and integrating singles, inuit (the indigenous people) and families successfully established a viable community. Pewer problems were encountered than is usual in other isolated cold regions communities.

The central focal point of the town, a large dome, was diluted by later construction of buildings housing separate recreational and social facilities. Since the buildings are too costly to remove, the only method of restoring the focal point is to build connecting links at upper levels of the recreational buildings.

SOME ASPECTS OF SOVIET TRENCHING MA-CHINES

Mellor, M., Feb. 1980, 13p., ADA-082 176, 1 ref. 35-2597

TRENCHING, FROZEN GROUND, EARTH-WORK, EQUIPMENT, DESIGN.

Technical characteristics of Soviet trenching machines are assessed and compared with those of similar machines built in the United States and Europe. The report deals with transverse rotation machines and belt machines, considering transverse rotation machines and belt machines, considering rotor speeds and belt speeds, tool speeds, power /weight ratios, power density, traverse speeds, and effective mean cutting pressures. The probable capabilities of Soviet machines for cutting frozen ground are assessed. It is concluded that, while general design characteristics are satisfactory, construction and product development are weak, and performance in frozen ground is not expected to be impressive.

DOCUMENTATION FOR A TWO-LEVEL DY-NAMIC THERMODYNAMIC SEA ICE MODEL. Hibler, W.D., III, Feb. 1980, 35p., ADA-084 273, 9

34-3329

SEA ICE, ICE THERMAL PROPERTIES, THER-MODYNAMIC PROPERTIES, HEAT TRANS-FER, ICE MECHANICS, ICE COVER THICK-NESS, MATHEMATICAL MODELS, COMPUTER PROGRAMS, RHEOLOGY.

PROGRAMS, RHEOLOGY.

A discussion of the numerics and computer code for a two-level dynamic thermodynamic sea ice model is presented. For interested users a listing of the computer code and results from a 21-day test run are included as appendices. To a large degree this report is meant to serve as an extended appendix to an article by the author in the Journal of Physical Oceanography (see 34-741) describing his model and a variety of simulation results. The model consists of a two-level ice thickness distribution coupled to the ice dynamics by a plastic rheology. In addition to the ice intersection, the momentum balance includes nonlinear wind dynamics by a plastic rheology. In addition to the interaction, the momentum balance includes nonlinear w and water drag terms, Coriolis force, and inertial and mom and water drag terms, Coriolis force, and inertial and momen-tum advection terms. The numerical scheme is formulated in an energy-conserving manner in a fixed Eulerian grid which allows simulation over unlimited time intervals. The momentum balance (including inertial terms) is numerically treated in a semi-implicit manner so that time steps of up to one day in length may be used if desired. The boundariea, grid size and time step magnitude are easily modified so that the model should have application to a variety of climate and forecasting problems.

SR 80-09

THICKNESS-TENSILE STRESS RELA-TIONSHIP FOR LOAD-BEARING ICE. Johnson, P.R., Feb. 1980, 11p., ADA-084 274, 3 refs.

ICE COVER STRENGTH, ICE LOADS, ICE CROSSINGS, ICE ROADS, TENSILE PROPERTIES, STRESSES, ICE COVER THICKNESS.

TIES, STRESSES, ICE COVER THICKNESS.

The "bearing capacity" of a floating ice sheet is of considerable interest. The pattern of ice thickness vs tensile stress for a fixed load and fixed ice properties was examined and showed some constant relationships. It proved possible to completely describe the ice thickness-tensile stress pattern in terms of a single number. When the load was changed by increasing the payload but not altering the geometry of the load pattern, other relationships were found that described the tensile stress in the ice sheet for any combination of payload and ice thickness. This provides a simple method of finding tensile stress in the ice that can be used in the field. Further studies are planned.

SR 80-10

OPERATION OF THE CRREL PROTOTYPE AIR TRANSPORTABLE SHELTER. Flanders, S.N., Feb. 1980, 73p., ADA-084 275.

PORTABLE SHELTERS, COLD WEATHER PER-FORMANCE, TRANSPORTATION, AIR-PLANES, LOGISTICS.

PLANES, LOGISTICS.

This report describes the operation of the CRREL prototype air-transportable shelter which was designed specifically for use in cold regions. The operating instructions cover moving the shelter on its own wheels or skin, loading it onto a truck or military transport aircraft, slinging it from a helicopter or preparing it for shipment as an ISO container. The report details how to site the shelter and expand it to about double its transport size. The report also covers operation of the utility systems, including the on-board alternator set, the primary and auxiliary heating systems, the water system, and various safety systems.

SR 80-11 SNOW FORTIFICATIONS AS PROTECTION AGAINST SHAPED CHARGE ANTITANK PRO-**JECTILES**

Farrell, D.R., Mar. 1980, 19p., ADA-084 276. 14.3332

SNOW STRENGTH, FORTIFICATIONS, COLD WEATHER CONSTRUCTION, COLD WEATHER OPERATION, SNOW (CONSTRUCTION MATERIAL), EXPLOSION EFFECTS, IMPACT MATERIAL), EXPLOSION TESTS, DETONATION MENTS.

This report chronicles an investigation of the effectiveness of snow fortifications. The test was planned to observe and measure how packed snow absorbs the energy of high explosive antitank (HBAT) ammunition. In the test plan both the possibility of non-detonation due to insufficient resistance in snow and the rate of deterioration of a snow reassance in snow and the rate of deterioration of a snow embankment with repeated impacts were considered. The 90-mm M67 recoilles rifle was used because it has a relatively low velocity, and its charge was more likely to not detonate than that of a high velocity weapon. The findings indicate that snow can be used to good advantage for building expedient fortifications, particularly in situations where large volumes of snow have to be cleared from roads and airfields.

SR 80-12 DRILLING AND CORING OF FROZEN GROUND IN NORTHERN ALASKA, SPRING

Lawson, D.E., et al, Mar. 1980, 14p., ADA-084 277,

Brockett, B.E.

DRILLING, PERMAFROST STRUCTURE, STRA-TIGRAPHY, GROUND ICE, PERMAFROST SAMPLERS, CORE SAMPLERS, EQUIPMENT.

Frozen samples of perennially frozen ground were obtained from 33 holes drilled at six locations in the National Petroleum Reserve, Alaska, in the spring of 1979. Total depth of drilling was 510 m (1670 ft), of which 178 m (384 ft) was cored. The objectives of the program were to define the location and extent of segregated and massive ice at each location and to determine the origins and ages of the ground ice through studies of the hole stratigraphy and future laboratory analyses of core samples.

EXTENDING THE USEFUL LIFE OF DYE-2 TO 1986. PART 2: 1979 FINDINGS AND FINAL RECOMMENDATIONS.

Tobiasson, W., et al, Apr. 1980, 37p., ADA-084 278, 8 refs.

Tilton, P. 34-3334

34-33-34
RADAR, STATIONS, SNOW ACCUMULATION, ICE FORMATION, SNOW STRENGTH, LOADS (FORCES), STEEL STRUCTURES, STRESSES, COST ANALYSIS.

COST ANALYSIS.

A major construction effort is needed at Dew Line Ice Cap Station DYE-2 to extend its useful life to 1986. That work should be done as soon as possible because the truss enclosure is deteriorating rapidly. Although a 210-ft sideways move as was accomplished at DYE-3 in 1977 is technically feasible, the alternative of backfilling the truss enclosure with ice is expected to cost about \$2.7 million less. Unless there is a strong possibility that DYE-2 will be needed for many years beyond 1986, the ice backfill alternative is recommended.

SR 80-14

CRREL ROOF MOISTURE SURVEY, PEASE AFB BUILDINGS 35, 63, 93, 112, 113, 120 AND

Korhonen, C., et al, Mar. 1980, 31p., ADA-084 279, 3 refs.

34-3335 ROOFS, MOISTURE TRANSFER, DETECTION, INFRARED SPECTROSCOPY, THERMAL INSU-LATION, MEASURING INSTRUMENTS.

We surveyed the roofs of seven buildings at Pease AFB with a hand-held infrared scanner to detect wet insulation. We used white spray point to outline the wet areas and took core samples of the built-up membrane and insulation to verify our findings. Flashing defects around penetrations and bordering walls appear to be the major cause of the wet insulation found on these roofs. Since most problem acreas are localized, we directed our regrets recommendations areas are localized, we directed our repair recommendations toward salvaging as much of each roof as is economically

SR 80-15 REGIONAL DISTRIBUTION AND CHARAC-TERISTICS OF BOTTOM SEDIMENTS IN ARC-TIC COASTAL WATERS OF ALASKA. Sellmann, P.V., Apr. 1980, 50p., ADA-084 922, Refs.

35-2598

SUBSEA PERMAFROST, PERMAFROST DISTRI-BUTION, BOTTOM SEDIMENT, MARINE GEOLOGY, SEDIMENT TRANSPORT, PERMA-FROST DEPTH, ICE SCORING, OFFSHORE STRUCTURES, ARTIFICIAL ISLANDS, CONSTRUCTION MATERIALS, OFFSHORE DRILL

This report includes a discussion of some of the properties and characteristics of offshore marine sediments found in the U.S. Beaufort Sea that could influence aspects of offshore development. A collection of references is also included in an appendix. Perennially and seasonally frozen sediments are extremely common, with variable distribution and properties. The depth to the top of lockonded permatrost can be as little as 7 m below the seabed many kilometers from the sea coast. The subsea permatrost can contain visible ground ice similar to that observed on land, and can be anticipated to cause problems at least as great as those experienced on land.

NITROGEN TRANSFORMATIONS IN A SIMU-LATED OVERLAND FLOW WASTEWATER TREATMENT SYSTEM.

Chen, R.L., et al, Apr. 1980, 33p., ADA-084 280, 36

Patrick, W.H., Jr.

WASTE TREATMENT, WATER TREATMENT, NUTRIENT CYCLE, SOIL CHEMISTRY.

NUTRIENT CYCLE, SOIL CHEMISTRY.

Treating wastewater in properly designed and operated overland flow systems results in significant amounts of N being
removed through nitrification-denitrification reactions. Application of wastewater containing NH4-N in a simulated
overland flow model led to the disappearance of sumonium
and the formation of nitrate in oxidized surface soil. The
N balance in the simulated overland flow system was estimated
by using labeled 15 N. The amount of N removed in
the system depends upon denitrification rates. The results
of this study indicated that N adsorption on the soil complex
and uptake of applied ammonium by vegetation accounted
for the N removed in the overland flow systems. The
adsorbed ammonium on the serated surface soil mass was
nitrified and converted to oxidized forms of N. The
nitrate thus formed diffused downward to the reduced zone
during subsequent wastewater applications. Some of this
nitrate then denitrified and converted to gaseous form of
N or was assimilated and reduced by plant life. Results
of the overland flow studies indicated that approximately
55-68% of wastewater NH4-N added to the simulated overland
flow system was unaccounted for in controlled laboratory m was unaccounted for in controlled laboratory nts. This NH4-N was presumably returned to

SR 20-17

INFLUENCE OF NOSE SHAPE AND L/D RATIO ON PROJECTILE PENETRATION IN FROZEN SOIL.

Richmond, P.W., Apr. 1980, 21p., ADA-085 398, 10

FROZEN GROUND, PROJECTILE PENETRA-TION, SOLUTIONS, EXPERIMENTATION.

This report presents the results of a laboratory test program designed to determine the applicability of two analytical solutions to projectile penetrations in frozen soils. The test program consisted of firing small caliber cylindrical projectiles into frozen soil targets. Four types of 7.9-mm-diam receivables were nested. icas program consisted of firing amail caliber cylindrical projectiles into frozen soil targets. Four types of 7.9-mm-diam projectiles were tested: two with a hemispherical nose the other two flat-nosed, with both long (length/diameter = \pm 4) and short (L/D = 2) versions of each nose shape. Prestion depth versus impact velocity data are presented. Comparisons of the data indicate that a flat-nosed projectile is a less efficient penetrator than one of equal weight with a hemispherical nose. A small increase in resistance to penetration is observed for an increased L/D ratio.

SR 80-18

DEICING A SATELLITE COMMUNICATION ANTENNA

Hanamoto, B., et al, Apr. 1980, 14p., ADA-085 397. Gagnon, J.J., Pratt, B. 34-3451

ICE PREVENTION, ANTENNAS, SPACECRAFT, PROTECTIVE COATINGS, HEATING, THERMAL EFFECTS, POLYMERS.

Ice buildup on com signal reception pr cm (0.25 in.). C loe buildup on communication antenna dishes begins to cause signal reception problems when the thickness exceeds 0.64 cm (0.25 in.). CRREL's copolymer coating, which reduces the adhesive force between ice and the coated surface, was tested on antenna dish panels to facilitate ice removal. A combination of the copolymer coating and heat proved to be an effective method of removing ice from the panel. SR 80-19

WINTER ENVIRONMENTAL DATA SURVEY OF THE DRAINAGE BASIN OF THE UPPER SUSITNA RIVER, ALASKA.

Bilello, M.A., Apr. 1980, 30p., ADA-086 931, 6 refs.

CLIMATE, ICE COVER, SNOW COVER, METEOROLOGICAL DATA, WINTER, UNITED STATES—ALASKA—SUSITNA RIVER.

STATES.—ALASKA—SUSITNA RIVER.
Basic data on the winter climate and measurements on all available anow and ice cover conditions were compiled for an area in and around the upper Susitna River basin of Alaska. The 10 years of tabulated data (from Sep. 1964 to May 1974) for 16 locations include average monthly values of air temperature, pracipitation amounts (including total anowfall) and maximum depth of anow on the ground. Ice thickness measurements and other related winter surface conditions on rivers in the basin are included in the report. Detailed observations on physical properties of the snow over and the rate at which soil thaws in the apring are also provided for selected stations near the area under study.

ST 80-20 SEDIMENT DISPLACEMENT IN THE OT-TAUQUECHEE RIVER—1978-1978.

Martinson, C.R., May 1980, 14p., ADA-089 787, 3

35.074 SEDIMENT TRANSPORT, BOTTOM SEDI-MENT, ICE SCORING, ICE EROSION, BANKS (WATERWAYS), RIVER ICE, HYDROLOGY

A three-year study of sediment displacement was conducted on a short section of the Ottauquechee River in Vermont that has erosional problems caused by ice. The results of cross-sectional surveys showed large quantities of the bank eroded and deposition in the bed within the study area. The erosion appears to have been caused by 1) the ice securing the banks and 2) ice plugging the channel and diverting the flow toward the banks.

SR 80-21

CONSTRUCTION OF AN EMBANEMENT WITH FROZEN SOIL.
Botz, J.J., et al, May 1980, 105p., ADA-086 877, 44

refs.

Hass, W.M.

Hasa, w.m.
34-3873
EMBANKMENTS, FROZEN GROUND
STRENGTH, COLD WEATHER CONSTRUCTION, SOIL COMPACTION, SETTLEMENT
(STRUCTURAL), FROST PENETRATION,
EARTHWORK, ENGINEERING, EXCAVATION,
EARTHWORK, ENGINEERING, EXCAVATION, ENGINEERING, EXCAVATION, ENGINEERING, EXCAVATION, ENGINEERING, EXCAVATION, ENGINEERING, EXCAVATION, ENGINEERING, EXCAVATION, ENGINEERING STABILITY, SOIL PHYSICS, SOIL TEMPERA-TURE, TESTS.

TURE, TESTS.

This paper presents the construction procedure, data and snalysis from an experimental field program to determine the rippability and compaction characteristics of frozen soil. Also investigated was the stability upon thawing of the frozen soil compacted in the field. From the results of the experimental program, several important conclusions concerning winter earthwork were obtained. 1) Ripping frozen soil can be accomplished with heavy equipment which will produce a large range of chunk sizes. 2) The effectiveness of field compaction of frozen material is highly dependent on the mosture content of the soils. 3) The magnitude of settlement in embankments constructed of frozen material is closely related to the compacted dry density of the placed soil.

SR 80-22 ESTIMATING COSTS OF ICE DAMAGE TO PRI-VATE SHORELINE STRUCTURES ON GREAT LAKES CONNECTING CHANNELS. Carey, K.L., May 1980, 33p., ADA-089 781. 35-2599

STRUCTURES, DAMAGE, ICE LOADS, IMPACT STRENGTH, ICE PRESSURE, ICE NAVIGA-TION, COST ANALYSIS.

Tion, Cost Anal. 1818.

The possible extension of the navigation season through the entire winter or a portion thereof has been under consideration for the Great Lakes and the St. Lawrence Seaway for a number of years. To balance the benefits and costs of such an extension it is necessary to determine the damage costs to shore structures that might result from ice loosened by ship passage. This paper is concerned with the interconceting channels of the Lakes where there is estimated to be \$18,000,000 (1976 dollars) worth of small, private, vulnera-

SR 20-23

RADIO-ECHO SOUNDING IN THE ALLAN HILLS, ANTARCTICA, IN SUPPORT OF THE METEORITE FIELD PROGRAM.

Kovaca, A., May 1980, 9p., ADA-086 858, 3 refs. 34-3874

RADIO ECHO SOUNDINGS, GLACIER THICK-NESS, GLACIER SURVEYS, ICE COVER THICK-NESS, POLLUTION, ANTARCTICA—ALLAN HILLS.

Radio-echo sounding measurements made on Ross Island and in the Allan Hills, Antarctica, indicate that radio-echo sounding may offer the unique possibility of detecting a buried meteorite in glacial ice. The results also revealed

internal layering within the snow on Ross Island and in the snow filling an ice depression west of Allan Nunatak. Radio-echo sounding also gave the depth to bedrock near the west side of Allan Nunatak. The greatest ice depth measured was 310 m.

SR 80-24 1979 GREENLAND ICE SHEET PROGRAM. PHASE 1: CASING OPERATION.

Rand, J.H., June 1980, 18p., ADA-089 699, 5 refs. 34-3485

ICE DRILLS, THERMAL DRILLS, GLACIOLO-GY, LININGS, GREENLAND.

A modified CRREL thermal drill was used at DYE-3 in Greenland to drill a 8.75-in.-diameter hole 251 ft deep for the installation of a steel casing. This activity was accomplished by a drill team from CRREL in preparation for the Danish deep drill tests. Included in this report is a description of both the drilling and casing operation as well as a description of the equipment used.

ROOFS IN COLD REGIONS: MARSON'S STORE, CLAREMONT, NEW HAMPSHIRE. Tobiasson, W., et al, June 1980, 13p., ADA-089 788.

Korhonen, C.

ROOPS, BITUMENS, COLD WEATHER PER-FORMANCE.

FORMANCE.

A reinforced, single-ply PVC membrane was examined five years after being applied over a leaky, built-up, bituminous membrane. The bare PVC membrane was dirty, poorly drained and littered with broken glass, nails and such, yet no flaws were evident on leaks reported.

Full PVC was quite flexible.

Disgonal wrinkles at a parapet wall were attributed to workmanship; other observations suggested that membrane shrinkage had not occurred. The membrane has functioned well for five years and years and appears to be in good condition.

SR 80-26 WORKING GROUP ON ICE FORCES ON STRUCTURES.

Carstens, T., ed, June 1980, 146p., ADA-089 674, Refs. passim. For individual articles see 35-508 through 35-511. 35-507

ICE PRESSURE, ICE LOADS, HYDRAULIC STRUCTURES, DAMS, LOADS (FORCES), ICE SOLID INTERFACE, TEMPERATURE VARIATIONS, FLOATING ICE, ICE WEDGES, ICE SHEETS.

DYNAMICS OF NH4 AND NO3 IN CROPPED SOILS IRRIGATED WITH WASTEWATER

Iskandar, I.K., et al, June 1980, 20p., ADA-090 575, Parker, L.V., McDade, C., Atkinson, J., Edwards, A.P.

Parker, L. V., McDeue, C., Assault, S., S72
WASTE DISPOSAL, WATER TREATMENT, IRRIGATION, SOIL CHEMISTRY, NUTRIENT CYCLE, AGRICULTURE.

1) to obtain information

CLE, AGRICULTURE.

The objectives of this field study were 1) to obtain information on the dynamic behavior of wastewater NH4 and NO3 in soils, 2) to determine the relative abundance of NH4 and NO3 in soils receiving wastewater, and 3) to evaluate the seasonal effect on the fate of wastewater NH4 applied to soils in a slow infiltration system. The study was conducted using an on-going test plot which contained two soil types and was covered with forage grass. Samples were collected in June and October to study the seasonal effect on the dynamic of N. The concentrations of NH4 and NO3 in the soil reached a daily, quasi-steady state condition. The seasonal effect on the relative amounts of NH4 and NO3. The concentrations of both NH4 and NO3. The concentrations of both NH4 and NO3 in profile were high at the surface and decreased with depth, consistent with the higher organic matter content in the surface. Both NH4 and NO3 concentrations were higher in the finer texture Charlton silt loam soil than in the coarser texture Windsor sandy loam soil.

SR 80-28 ICE ADHESION TESTS ON COATINGS SUB-JECTED TO RAIN EROSION. Minsk, L.D., July 1980, 14p., ADA-089 698.

TIVE COATINGS, HELICOPTERS, TESTS.

TIVE COATINGS, HELICOPTERS, TESTS. Screening tests to select icephobic coatings displaying low ice release forces, both before and after exposure to rain erosion in a whirling arm simulator, were performed on approximately 60 commercial materials. A unique linear ball-slide shear test apparatus was designed to provide pure shear forces. No coating survived the erosion test to give an interfacial shear strength as low as 15 psi (103 kPa), an arbitrarily established goal. Several coatings showed shear strengths between 30 and 45 psi (207 and 310 kPa) after rain erosion.

SR 86-29
POST OCCUPANCY EVALUATION OF A
REMOTE AUSTRALIAN COMMUNITY: SHAY
GAP, AUSTRALIA.

Bechtel, R.B., et al, July 1980, 57p., ADA-089 675, 8

Ledbetter, C.B.

35-2600 URBAN PLANNING, HOUSES, BUILDINGS, SITE SURVEYS, ECOLOGY.

SITE SURVEYS, ECOLOGY.

A post occupancy evaluation (POE) was made of Shay Gap, an iron mining community in Western Australia. More than 50 design hypotheses were tested with results favoring the original design. Selecting a townsite surrounded by hills was deemed successful by residents. Keeping automobiles out of the living areas increased the safety of children and made residents walk and socialize more. A centrally located building housing the shopping facilities, beauty parior, bank, poet office, and mack bar served as the foculation of the community. Bland, off-white interiors allowed residents to express themselves when decorating. Shay Gap was a successful design concept for communities designed for remote areas in either hot or cold regions.

SR 80-30 DYNAMIC TESTING OF FREE FIELD STRESS GAGES IN FROZEN SOIL.

Aitken, G.W., et al, July 1980, 26p., ADA-089 676, 6

Albert, D.G., Richmond, P.W. 35-2601

FROZEN GROUND MECHANICS, STRESSES, IMPACT TESTS, SHOCK WAVES, SOIL ME-CHANICS, WAVE PROPAGATION.

CHANICS, WAVE PROPAGATION.

This report describes an attempt to develop a procedure for dynamic calibration of free-field soil stress gages embedded in a soil sample. The method presented utilizes a droptype impact testing machine and a small, instrumented container of soil. The velocity history of a shock pulse applied to the soil sample is measured and the applied stress computed; this value is then compared with data obtained from stress gages embedded in the soil. The results showed that the procedure is adequate for unfrozen soil, but for frozen soil the accuracy in the measurement of compressional wave velocity needs to be increased to obtain useful results.

REVIEW OF TECHNIQUES FOR MEASURING SOIL MOISTURE IN SITU.

McKim, H.L., et al, Aug. 1980, 17p., ADA-089 974, Refs. p. 13-17. Walsh, J.E., Arion, D.N.

35-976 SOIL WATER, ELECTROMAGNETIC PROPERTIES, TENSILE PROPERTIES, CLIMATIC FAC-TORS.

TORS.
Recently there has been an increased interest in the insitu measurement of soil moisture content in the areas of hydrology, meteorology, agriculture and environmental studies. Current methods generally have limitations, depending upon the use of the data, that greatly influence acquisition and reliability of the soil moisture determination. This report discusses gravimetric, nuclear, electromagnetic, tensiometric and hygroscopic techniques and the advantages and disadvantages of using the techniques. Emphasis is placed on the tensiometric and electromagnetic techniques. These two measurements when coupled would supply information on the wetting and drying soil moisture characteristic curves and thereby provide a means of tracing moisture movement under field conditions in cold climates.

CHARACTERISTICS OF ICE IN WHITEFISH BAY AND ST. MARYS RIVER DURING JANU-ARY, FEBRUARY AND MARCH 1979. Vance, G.P., Aug. 1980, 27p., ADA-089 950, 12 refs.

ICE BREAKING, ICE COVER THICKNESS, ICE

COVER STRENGTH, FLEXURAL STRENGTH, ICE DENSITY, METAL ICE FRICTION, METAL SNOW FRICTION, SNOW DENSITY, SNOW DEPTH, AIR TEMPERATURE.

DEPTH, AIR TEMPERATURE.
This report presents data on the full-scale trials of the U.S. Coast Guard loebreaker Katunai Bay, which was tested in plate ice that varied in thickness from 10 to 33 in. (25.4 to 83.82 cm) and had a snow cover of 1 to 6 in. (2.54 to 15.24 cm). In January the average temperature was -SC, and the ice flexural strength was 13,363 lb/sq.ft (640 kPa). In March the average temperature was -2C and the ice flexural strength was 11,643 lb/sq. ft (560 kPa). The specific weight (density) of the ice was 0.894 g/cu cm. The specific weight of the snow was in the area of 0.32 g/cm. The coefficient of friction between the ice/snow and steep lpate (coated and uncoated) varied from a low of 0.02 in the dynamic case of ice on the Inerta 160 coating to 0.47 for the static case of snow on a rusty steel plate.

SR 80-33 NEW HAMPSHIRE FIELD STUDIES OF MEM-BRANE ENCAPSULATED SOIL LAYERS WITH ADDITIVES.

Eaton, R.A., et al, Aug. 1980, 46p., 20 refa.

Berg, R.L. 35-977

SOIL FREEZING, FROST PENETRATION, SOIL STABILIZATION, SOIL WATER, FROST RESIST-ANCE, PAVEMENTS, ADMIXTURES, LIMING,

DESIGN.
This report describes the construction, instrumentation, and performance of membrane encapsulated soil layer (MESL) pavement test sections at the U.S. Army Cold Regions Research and Ragineering Laboratory in Hanover, New Hampshire, from 1973 to 1978. Membrane encapsulated soil layer construction involves using a waterproof membrane to protect low grade soils from absorbing moisture, especially during the freezing process. Most of these lower grade soils are frost-susceptible; in these soils water can be drawn to the freezing zone to form ice lenses, which in turn cause heaving of the surface. Lime, flyash, and sodium chloride were added to a silt material prior to encapsulation. These additives were incorporated to add strength to the silt, absorb excess moisture, and increase its load-supporting capabilities. Results show that 1) the moisture content within the MESL. sections remained relatively constant over the five years of testing, 2) a nonencapsulated lime-flyash-stabilized silt sections remained relatively constant over the five years of testing, 2) a nonencapsulated time-flyash-stabilized sitt material heaved 8.8 times as much as the identical material which was encapsulated, 3) the lime-flyash-stabilized MESL, had twice the strength of the plain or sali-stabilized MESL, 4) the sift with the additives had less frost heave within the MESL than the untreated silt. In summary, MESL's can be constructed to perform well in cold regions, thereby replacing high quality aggregates which are being depleted.

SR 80-34 DESIGN AND CONSTRUCTION OF FOUNDA-TIONS IN AREAS OF DEEP SEASONAL FROST AND PERMAPROST.

Linell, K.A., et al, Aug. 1980, 310p., ADA-090 324, Refs. p.307-310.

Lobacz, E.F. 35-886

35-886
PILE STRUCTURES, FOUNDATIONS, PERMA-FROST PRESERVATION, FROZEN GROUND MECHANICS, COLD WEATHER CONSTRUC-TION, FROST PENETRATION, FROST ACTION, FROST HEAVE, ENGINEERING, SOIL ME-CHANICS, DESIGN.

CHARACS, DESIGN.

This report presents engineering guidance for the design and construction of foundations in areas of deep seasonal frost and permafrost as developed up to the early 1970's. Attention is given to basic considerations affecting foundation design, site investigations, survey datum points, construction considerations, and monitoring performance. Included in the main text are 17 tables, 141 figures, and 213 selected references.

A bibliography presents 45 additional references.

RESINS AND NON-PORTLAND CEMENTS FOR CONSTRUCTION IN THE COLD. Johnson, R., Sep. 1980, 19p., ADA-092 952, 6 refs.

CEMENTS, COLD WEATHER CONSTRUCTION, CONSTRUCTION MATERIALS, POLYMERS.

A laboratory investigation was conducted to assess the potential A laboratory investigation was conducted to assess the potential of some resins and non-portland cements for structural concerted at low temperatures. The resins investigated were urethane (non-hydrophilic), epoxy and polyester, as well as a polysulfide polymer. Two non-portland (modified) cements were also tested. The curability of the resins, when mixed with fine aggregate, showed that they had potential for low temperature use in the following decreasing order: urethane, polyester, and epoxy. Of the non-portland cement materials, mixed as individual nest sluving one showed potential for low and epoxy. Of the non-portland cement materials, mixed as individual neat alurries, one showed potential for low temperature use at -10 C (using 3.9 C water).

SR 80-36 INFILTRATION CHARACTERISTICS OF SOILS AT APPLE VALLEY, MINN.; CLARENCE CANNON DAM, MO; AND DEER CREEK LAKE, OHIO, LAND TREATMENT SITES.
Abele, G., et al, Oct. 1980, 41p., ADA 093 350, 5 refs. McKim, H.L., Brockett, B.E., Ingersoil, J.

35-1726

SOIL WATER MIGRATION, PERMEABILITY, SOIL MECHANICS, SEEPAGE, WASTE TREAT-MENT, DENSITY (MASS/VOLUME), GRAVITY,

Large-scale, 3- to 6-m diameter infiltration tests provide realistic data for determining soil infiltration rates. Tensiometers can be used to monitor the relative degree of saturation during the test. At Apply Valley, Minnesota, the saturated infiltration rate is moderately rapid, at Clarence Cannon Dam, Missouri, the rates range from moderate to slow, and at Deer Creek Lake, Ohio, from moderately slow to slow.

SK 30-37
EFFECTS OF A TUNDRA FIRE ON SOILS AND PLANT COMMUNITIES ALONG A HILLSLOPE IN THE SEWARD PENINSULA, ALASKA.
Racine, C., Nov. 1980, 21p., ADA-094 6607, 21 refs.

TUNDRA, FIRES, DAMAGE, SOILS, PLANTS (BOTANY), VEGETATION, SLOPES.

(BOTANY), VEGETATION, SLOPES.

During summer 1977, wildfires burned extensive areas of low arctic tundra in the Seward Peninsula, Alaska. The present study was initiated in July 1978 to determine the effects of these fires on tundra soils and vegetation. Nine 10- x 1-m permanent transects were established at regular intervals along the topographic gradient of a burned hillslope in the central Seward Peninsula near Imuruk Lake. Soil characteristics and plant species density and cover were determined in each of the 90 1- x 1-m plots on this slope during July of both 1978 and 1979.

SR 80-38

THERMAL DIFFUSIVITY OF FROZEN SOIL. Haynes, F.D., et al, Dec. 1980, 30p., ADA-094 605, 10

Carbee, D.L., VanPelt, D.J.

35-2603

35-2003
FROZEN GROUND PHYSICS, THERMAL DIFFUSION, THERMAL CONDUCTIVITY, SPECIFIC HEAT, HEAT TRANSFER, TEMPERATURE EFFECTS, DENSITY (MASS/VOLUME), SOIL WATER, PERMAFROST PHYSICS.

Knowledge of the thermal diffusivity of frozen soils is nece for transient heat transfer analysis. The specific heat, thermal conductivity and density for a sand, a silt and a clay were obtained experimentally and used to calculate their thermal diffusivity. These properties were measured their thermal diffusivity. These properties were measured over a range of temperatures from -50 C to +45 C and for moisture contents from dry to saturated. The use of a differential scanning calorimeter for obtaining specific heat values was proven to be a reliable technique.

STRUCTURAL EVALUATION OF POROUS PAVEMENT TEST SECTIONS AT WALDEN POND STATE RESERVATION, CONCORD, MASSACHUSETTS.

Eaton, R.A., et al, Dec. 1980, 43p., ADA-094 606, 5

Marzbanian, P.C.

35-2006

BITUMINOUS CONCRETES, PAVEMENTS, POROUS MATERIALS, BEARING STRENGTH, CONCRETE STRENGTH, STRUCTURAL ANALYSIS, COLD WEATHER PERFORMANCE, LOADS (FORCES), DEFORMATION, TESTS.

LOADS (FORCES), DEFORMATION, TESTS. This report presents the results of repeated load tests upon various porous pavement test sections constructed in an overflow parking lot at Walden Pond State Reservation in Concord, Massachusetts. From the fall of 1977 to the spring of 1979, the seasonal structural responses of the sections were monitored with a repeated plate bearing apparatus. After the first set of fall and spring tests, some sections were reconstructed because the asphalt concrete pavement was not porous enough. Test points were added or replaced to accommodate the reconstructed sections. Results show that the dense asphalt concrete distributed the load over to accommodate the reconstructed sections. Results show that the dense asphalt concrete distributed the load over a greater area than the porous asphalt concrete, thicker pavements were stronger for both dense and porous asphalt concrete, and the deflection basin depth and diameter changed proportionately to applied loads.

BUILDING UNDER COLD CLIMATES AND ON PERMAPROST; COLLECTION OF PAPERS FROM A U.S.-SOVIET JOINT SEMINAR. LENINGRAD, USSR.

U.S.-Soviet Joint Seminar on Building under Cold Cli-U.S. Soviet Joint Seminar on Building under Cold Climates and on Permafrost, Leningrad, June 24-29, 1979, Dec. 1980, 365p., ADA-097 516, Refs. passim. For individual papers see 35-1966 through 35-1986. U.S. Department of Housing and Urban Development, U.S. Acceptable of Paris 1981, U.S. Army Corps of Engineers.

COLD WEATHER CONSTRUCTION, BUILD-INGS, PERMAFROST BENEATH STRUCTURES, CLIMATIC FACTORS, MEETINGS.

EMBANEMENT DAMS ON PERMAPROST IN

THE USSR.
Johnson, T.C., et al, Dec. 1980, 59p., ADA-095 141,

Sayles, F.H.

35-2005 PERMAFROST. EARTH DAMS, PERMAFROST, EMBANK-MENTS, THERMAL REGIME, USSR—SIBERIA. EARTH The report documents a study tour of the USSR to determine the current practices in analyzing the thermal regime of embankment dams on permafrost and in application of these practices in designing dams. The results of visits to earth and rockfill dams on permafrost in Siberia are summarized. Discussions with the designers of the dams, and with a

construction manager and an operations manager, are recorded. The leading Soviet engineers and scientists specializing in analysis of the thermal regime of embankment dams on permafrost were consulted, and the discussions are summarized. Experimental facilities of institutes concerned with this ques-

OVERLAND FLOW: REMOVAL OF TOXIC VOLATILE ORGANICS.

Jenkins, T.F., et al, Feb. 1981, 16p., ADA-097 576, 34

Leggett, D.C., Martel, C.J., Hare, H.E. 35-2581

WASTE TREATMENT, WATER TREATMENT, FLOODING, LAND RECLAMATION, WATER CHEMISTRY.

A small-scale overland flow system was studied to determine its effectiveness in reducing the levels of volatile trace organics in municipal wastewater. Chlorinated primary wastewater, water collected from the surface at various points downslope, and runoff were analyzed by gas chromatography/mass spectrometry using a purge and trap sampler. The results indicated that overland flow was effective in reducing the levels of these substances by 80-100% depending on the specific substance and the application rate. The removal mechanism was found to follow first order kinetics. The second little mechanism to exhibit the observed behavior its effectiveness in reducing the levels of volatile trace org mechanism was found to follow first order kinetics. The most likely mechanism to explain the observed behavior is volatilization. Comparison of the experimental results with theoretical prediction using published models resulted in reasonable agreement considering the complexity of the system compared to the model systems.

METHOD FOR COINCIDENTALLY DELER-MINING SOIL HYDRAULIC CONDUCTIVITY AND MOISTURE RETENTION CHARACTERIS-

Ingersoll, J., Mar. 1981, 11p., ADA-099 136, 3 refs.

SOIL WATER, WATER RETENTION, PERMEA-SULTY, HYDRAULCS, CONDUCTION, DENSI-TY (MASS/VOLUME), TENSILE PROPERTIES, GLACIAL DEPOSITS, EQUIPMENT.

JIACIAL DEPOSITS, EQUIPMENT.

A constant-head permeameter has been modified to include the essential components of a Tempe cell moisture extractor. With this equipment, tesas for saturated hydraulic conductivity (permeability), unsaturated hydraulic conductivity and moisture retention characteristics of the soil can be conducted using the same soil sample. The procedure can be used for both absorption and desorption phases. Test results from four different soils (a glacial till, a fine aand, a silt and a coarse sand) are presented. The effects of density on hydraulic conductivity and moisture retention characterison hydraulic conductivity and moisture retention characteris

INVESTIGATION OF THE SNOW ADJACENT TO DYE-2, GREENLAND. Ueda, H.T., et al, Mar. 1981, 23p., ADA-099 139, 8

Goff, M.A., Nielsen, K.G.

SNOW STRENGTH, COMPRESSIVE PROPERTIES, SNOW DENSITY, LOADS (FORCES), SNOW DEPTH, DRILL CORE ANALYSIS.

SNOW DEPTH, DRILL CORE ANALYSIS.

Snow samples from five 50-ft (15.2m) deep holes, augered adjacent to the west side of DEW line Station Dye-2 in Greenland, were investigated for density and unconfined compressive strength. Forty-two percent of the recovered cores were tested. Ninety-three percent of the samples tested had a length/diameter ratio greater than 2:1. The loading rate was 2 in./min (51 mm/min). Sample endeffects appeared to influence a high percentage of the failures. The heavily disturbed nature of the material is evidenced in the widely scattered values of density and strength with depth. A minimum and maximum strength value of 31 psi (0.21 MPa) and 1055 psi (7.34 MPa) respectively were obtained from a hole located 50 ft (15.2 m) from the structure. Using an approach similar to that used prior to the Dye-3 move in 1976, a safety factor exceeding 6.5 is obtained against a brittle bearing failure based on a maximum footing design load of 2000 lb/sq ft (96 kPa).

SR 81-04

PLANT GROWTH ON A GRAVEL SOIL: GREEN-HOUSE STUDIES.

Palazzo, A.J., et al, Mar. 1981, 8p., ADA-098 598, 9

Graham, J.M.

35-3692 GRASSES, GROWTH, SOIL STABILIZATION, GRAVEL, NUTRIENT CYCLE.

GRAVEL, NUTRIENT CYCLE.

Two greenhouse studies were performed with gravel soils to determine the requirements for nitrogen (N), phosphorus (P), and potassium (K) for grass establishment and to assess the establishment performance of 15 types of grasses. The fertilizer study consisted of 30 treatments, each representing a different combination of application rates of N, P, and K. A seed mixture containing "Nugget" Kentucky bluegrass, "Penniswn" rod fescue, and annual ryegrass was sown, and the plants were harvested 133 days after sowing. Plant leaf and root weights were measured, and soil samples were analyzed for pH, P, K and soluble salts. In the grass study, 15 grasses were grown for 76 days. All treatments

were fertilized at the beginning of the study. Plant establishment was periodically assessed and yields were measured at the end of the study. In the fertilizer study, N and P were shown to be limiting to leaf growth on this soil. Applications of P were the most beneficial for root growth. Needs for K were less evident, but it was required for Applications of P were the most beneficial for root growth. Needs for K were less evident, but it was required for maximum leaf growth at the higher application rates of N and P. The greatest yields were recorded when all three elements were applied, while at the lower application rates only N and P were required to promote growth. SR 81-05

OPPER OCEAN TEMPERATURE, SALINITY AND DENSITY IN THE VICINITY OF ARCTIC DRIFT STATION FRAM 1, MARCH TO MAY

McPhee, M.G., Mar. 1981, 20p., ADA-098 597, 2 refs.

35-3706

OCEANOGRAPHY, SALINITY, TEMPERATURE GRADIENTS, DENSITY (MASS/VOLUME), DRIFT STATIONS, ARCTIC OCEAN.

DRIFT STATIONS, ARCTIC OCEAN.

A program designed to measure temperature and conductivity in the upper 270 m of the Arctic Ocean within a 150-km radius of Drift Station FRAM I is described, and data in the form of profiles of temperature, salinity, and density as functions of depth are presented for each of 104 castrade with a portable, self-contained conductivity-temperature-depth instrument. Seventy-five of the casts were made away from the ice station at sittle reached by helicopter. Details of sampling procedure, instrument calibration, and data organization are given.

SR 81-06

INTRODUCTION TO THE BASIC THERMODY-NAMICS OF COLD CAPILLARY SYSTEMS. Colbeck, S.C., Mar. 1981, 9p., ADA-099 138, 9 refs. 35-3712

THERMODYNAMICS, CAPILLARITY, FROZEN GROUND THERMODYNAMICS, WET SNOW, ICE CRYSTAL GROWTH, ENTHALPY, ANALYSIS (MATHEMATICS).

The basic principles of phase equilibrium thermodynamics are reviewed. These principles are used to derive several useful relations such as camotic pressure and Kelvin's equation. Several examples are given of the application of thermodynamics to cold regions materials such as grain growth in wet snow and capillary condensation in rocks.

LABORATORY AND FIELD USE OF SOIL TEN-SIOMETERS ABOVE AND BELOW 0 DEG C. Ingersoll, J., Apr. 1981, 17p., ADA-101 561, 8 refs.

35-3796

30-3796
SOIL MECHANICS, SOIL WATER, WATER RE-TENTION, DENSITY (MASS/VOLUME), TEN-SILE PROPERTIES, FROST PENETRATION, TEMPERATURE EFFECTS, MEASURING IN-STRUMENTS.

Methods for using tensiometers in conjunction with moisture retention characteristic curves for non-destructive soil water measurements are presented for above- and below-freezing situations of engineering interest. Four methods for determining moisture retention characteristics, three tensiometer types, and several methods of recording soil suction are discussed. Procedures for preparing, modifying and installing tensiometers for field use in cold climates are explained. Several examples of moisture retention characteristics are shown, including the effect of soil density on water retention. Examples of soil tension ahead of and behind a frozen soil zone are also presented.

SR 81-08 SUBLIMATION AND ITS CONTROL IN THE

CRREL PERMAFROST TUNNEL.
Johansen, N.I., May 1981, 12p., ADA-101 555, 3 refs.
Chalich, P.C., Wellen, E.W. 35-3736

SUBLIMATION, PERM. TION, DUST CONTROL. PERMAFROST PRESERVA-

The U.S. Army Cold Regions Research and Engineering Laboratory's permafrost tunnel at Fox, near Fairbanks, Alaska, Laboratory's permafrost tunnel at Fox, near Fairbanks, Alaska, was used to investigate the sublimation process in permafrost silt. The rate of increase in thickness of the dried silt layer from sublimation was found to be approximately 0.023 in. (0.058 cm) in I month and closely related to the relative humidity in the tunnel. Sublimation prevention studies consisted of evaluation of various membranes to impede the sublimation. Ice was found to show promise as an easily installed, effective membrane when applied as a fine water mist and subsequently left to freeze.

SR 81-09 ICE JAM PROBLEMS AT OIL CITY, PENNSYL-

Deck, D.S., et al, May 1981, 19p., ADA-103 736, 9 refs.

36-179 ICE JAMS, FLOOD CONTROL, ICE CONDI-TIONS.

Oil City, Pennsylvania, is at the confluence of Oil Creek and the Allegheny River. The business district lies within the flood plain of Oil Creek, and as of the winter of 1980, 25 ice jam flooding events had occurred since the mid-

1800's. An investigation was done to determine why Oil City was subject to perennial ice jams and nearly biennial ice jam floods. Ice conditions were analyzed and it was determined how and why the jams occurred. By controlling where the initial ice cover forms, Oil City's ice jam floods can be alleviated. Ice control structures will be used to encourage the early formation of ice cover and hence eliminate frazil ice. This will greatly reduce the amount of ice which currently develops in both Oil Creek and the Allegheny River.

FABRIC INSTALLATION TO MINIMIZE RE-FLECTION CRACKING ON TAXIWAYS AT THULE AIRBASE, GREENLAND. Baton, R.A., et al, May 1981, 26p., ADA-103 737, 2

Godfrey, R. 36-407

RUNWAYS, CRACKING (FRACTURING), COUNTERMEASURES, BITUMENS, CON-CRETE DURABILITY, CONCRETE STRENGTH. In August 1978 two types of fabrics were placed on sections of taxiways 1 and 3 of Thule AB, Greenland, to study the ability of fabrics with an AC 2.5 overlay to minimize reflection cracking in severe climates. Both fabrics should retain durability and mechanical strength under Thule's arctic

SR 21-11 METHOD FOR MEASURING BRASH ICE THICKNESS WITH IMPULSE RADAR. Martinson, C.R., et al, June 1981, 10p., ADA-103 738, 3 refs.

Dean, A.M., Jr. 36-377

ICE FLOES, ICE COVER THICKNESS, LAKE ICE, RADAR ECHOES.

RADAR ECHOES.

During March 1980 a subsurface impulse radar system was successfully used on board a U.S. Coast Guard cutter to measure brash ice thickness in the Great Lakes. Manual ice thickness measurements were made in the test area to calibrate the radar data and to determine radar range settings. Radar-collected data were recorded on magnetic tape and later played back to a graphic recorder for interpretation. Most of the usable data were collected when the ship's speed was 3-4 knots.

SR 81-12 SEVEN-YEAR PERFORMANCE OF CRREL SLOW-RATE LAND TREATMENT PROTO-TYPES.

nkins, T.F., et al, July 1981, 25p., ADA-103 739, 6

Palazzo, A.J., Schumacher, P.W., Hare, H.E., Butler, P.L., Diener, C.J., Graham, J.M. 36-776

WASTE TREATMENT, WATER TREATMENT. LAND RECLAMATION, WATER CHEMISTRY, NUTRIENT CYCLE, STATISTICAL ANALYSIS, SOIL WATER.

SOIL WATER.

A set of six outdoor, slow-rate land treatment prototypes was operated from June 1973 through May 1980. Water quantity and quality data are presented for the wastewater applied to and the percotate leaving the 5-foot soil profile. Average concentration, mass loading and mass and percentage removal of wastewater constituents are presented on a yearly basis. Tabulations of crop production and nutrient uptake are also presented. Nutrient balance sheets summarize the relative amounts removed by plant uptake, deep percolation and other removal mechanisms for nitrogen and phosphorus.

EFFECTS OF ICE ON COAL MOVEMENT VIA THE INLAND WATERWAYS. Lunardini, V.J., et al, June 1981, 72p., ADA-103 740,

31 refa.

Minsk, L.D., Phetteplace, G.

36-939 36-939
ICE COVER EFFECT, CHANNELS (WATER-WAYS), COAL, FUEL TRANSPORT, LOCKS (WATER-WAYS), MARINE TRANSPORTATION, COLD WEATHER PERFORMANCE, DAMS.

COLD WEATHER PERFORMANCE, DAMS.
The part of the Inland Waterways which carries significant coal and which may experience significant ice problems includes the following rivers or waterways: Ohio, Monogahela, Allegheny, Kanawha, Upper Mississippi, and Illinois. Coal transportation along these rivers may be locally interrupted for periods up to 30 days or more every three to five years. Coal handling facilities, navigation channels, and lock and dam sites along the ice prone rivers were surveyed by visit or telephone to ascertain the acope of the ice problems. The importance of ice as a barrier to increased coal movement on the waterways studied manifests itself differently for each link of the flow system. In order of importance the ice will affect the navigation channels, locks and dams, and finally the coal loading unloading facilities. The coal handling facilities will not be significantly slowed down by ice problems associated with winter navigation.

SR 81-14 LOSSES FROM THE FORT WAINWRIGHT HEAT DISTRIBUTION SYSTEM.

Phetteplace, G., et al, June 1981, 29p., ADA-103 741, 6 refs.

Willey, W., Novick, M.A.

Wiley, W., NOVIES, WARTS 36-351 HEAT LOSS, ELECTRIC POWER, PIPELINES, STEAM, THERMAL INSULATION, COMPUTER APPLICATIONS, ANALYSIS (MATHEMATICS). APPLICATIONS, ANALYSIS (MATHEMATICS). This report estimates the heat losses from the heat distribt ion system at Fort Wainwright, Alaska. Specific data on the Fort Wainwright heat and power plant are given and a method is then developed to calculate the heat losses from buried utilidor systems, such as the one at Fort Wainwright. This method is programmed for computer execution and estimates are made for the Fort Wainwright system, where heat losses are found to be 204,500 MBtv/yr. Possible improvements to the system to reduce heat losses are examined. Of the possible combinations of additional pipe insulation investigated, the addition of 1 in. of insulation to the steam pipe only is the most economically favorable. The results also indicate that insulating only the generally larger pipes found in larger utilidors would be the most economically favorable approach. Possible reductions in heat losses due to reduced steam temperature are also given, as well as recommendations for refinement of the predictions.

LIMNOLOGICAL INVESTIGATIONS: LAKE KOOCANUSA, MONTANA. PT. 5: PHOS-PHORUS CHEMISTRY OF SEDIMENTS.

Iskandar, I.K., et al, July 1981, 9p., ADA-107 049, 13

Shukla, S.S.

36-1122 LIMNOLOGY, LACUSTRINE DEPOSITS, CHEMICAL COMPOSITION, BOTTOM SEDI-

MENT. This study characterizes the aediments from Lake Koocanusa (Libby Dam reservoir), Montana, in terms of their ability to sorb and release P. Sediment samples were collected at 12 stations located between the U.S.-Canadian border and Libby Dam (42 miles downstream of the border) during July 1977. The sediments from Lake Koocanusa are calcarous, low in organic matter (< 2.3%), and have a sitty loam or loam texture. Most of the P associated with these sediments was in the inorganic form (> 85%), which was highly correlated (r=0.89) with oxalate extractable Fe in the sediment. Surption tests, with concentrations of either 1 or 10 mg P/g sediments, showed that these sediments have limited ability to sorb additional P from concentrated solutions. The maximum amount sorbed at the lower P concentrations was 67% of the added P and was highly correlated with oxalate extractable Fe in the sediments. Deoption studies showed that very small amounts of both conjustion with Damase extractance re in the sediments. Description studies showed that very small amounts of both the originally bound P (1 to 2%) and the added P (< 6.3%) were released. Conclusion: the sediments in Lake Koocanusa act as a P sink.

SR 81-16 PROCEEDINGS OF THE INTERNATIONAL SO-CIETY FOR TERRAIN-VEHICLE SYSTEMS WORKSHOP ON SNOW TRACTION MECHAN-ICS, ALTA, UTAH, JAN. 29-FEB. 2, 1979. Harrison, W.L., ed, July 1981, 71p., ADA-106 972, Refs. passim. For individual papers see 36-1391

Refs. passim. F through 36-1397. 36-1390

SNOW MECHANICS, SNOW COMPRESSION, TRACTION, TRAFFICABILITY, VEHICLE WHEELS, TRACKED VEHICLES, MEETINGS, MATHEMATICAL MODELS.

This report reviews the state of the art of snow traction mechanics and presents the results of a limited field exercise that allowed participants to observe and practice current snow measurement processes and vehicle test procedures. The prime recommendations of the workshop attendees were the use of parameters basic to the laws of physics for the classification of snow strength, and 2) the use of instrument-ed tracked and wheeled vehicles for snow strength measure-

MACROSCOPIC VIEW OF SNOW DEFORMA-TION UNDER A VEHICLE.

Richmond, P.W., et al, July 1981, 20p., ADA-107 038, 10 refa

Blaisdell, G.L.

Blasseel, G.L. 36-1193 SNOW DEFORMATION, SNOW COMPRES-SION, LOADS (FORCES), VEHICLES, SNOW DENSITY, STRESSES, SNOW COMPACTION, TESTS.

TESTS.

In this report the deformation of snow under a vehicle is discussed. For snow with an initial density of less than 0.45 Mg/cu m, load transfer through shallow snow is shown to be attenuated by an interfacial boundary force. Evidence is presented that shows the existence of a density distribution in the deformed area. Results of a laboratory plate-sinkage test on sintered snow support this analysis. Maximum values obtained for the interfacial boundary force range from 1355 to 2670 N when the average density of the deformed area is about 0.5 Mg/cu m.

SR \$1-18 BOTTOM HEAT TRANSFER TO WATER BO-DIES IN WINTER.

O'Neill, K., et al, Sep. 1981, 8p., ADA-106-977. Ashton, G.D.

36-972

WATER TEMPERATURE, FREEZING POINTS, HEAT FLUX, HEAT TRANSFER, BOTTOM SEDIMENT, LIMNOLOGY, LAKES, PONDS, WINTER.

WINTER.

In many surface water bodics, water temperature closely follows ambient air temperature. This means that warmer water in winter absorbs best from below. The extent and pattern of winter heat gain is constrained by the fact that the water temperature does not fall below the freezing point. On the basis of a few simple assumptions, governing equations are solved here pertaining to heat flow in bottom sediments. The results are presented in general nondimensionalized curves. These allow estimation of water/sediment heat flux for any particular case, given truncation of the water temperature curve at the freezing point. The user must supply pertinent yearly air temperature mean and amplitude of variation, together with the thermal diffusivity for being a higher order finite element method which solves directly for temperature gradients and hence for heat flux. Thus the method provides particularly accurate flux values at high efficiency. The results illustrate in detail how winter water heat gain is less in cases where mean air temperatures are lower. temperatures are lower.

SR 81-19 MIZEX—A PROGRAM FOR MESOSCALE AIR-ICE-OCEAN INTERACTION; EXPERIMENTS IN ARCTIC MARGINAL ICE ZONES. 1. RE-SEARCH STRATEGY.

Wadhams, P., ed, June 1981, 20p., ADA-107 046, 59

Martin, S., ed, Johannessen, O.M., ed, Hibler, W.D., III, ed, Campbell, W.J., ed. 36-1310

36-1310
ICE AIR INTERFACE, ICE WATER INTERFACE, ICE EDGE, SEA ICE DISTRIBUTION, RESEARCH PROJECTS, CLIMATIC FACTORS, SEA
WATER, WATER TEMPERATURE.

This document describes the research strategy for a series of mesoscale studies of arctic marginal ice zones. The main goal of this program is to gain a better understanding of the processes occurring at the ice margin. These processes are relevant to climate, weather forecasting, petroleum exploration and production, marine transportation, naval operations, and commercial fisheries. In addition MIZEX will aid in determining what modifications to existing ice-ocean-atmospheric models are needed for better prediction near the

SR 81-20 MINE/COUNTERMINE PROBLEMS DURING WINTER WARFARE. FINAL REPORT OF A WORKSHOP.

Lunardini, V.J., ed, Sep. 1981, 43p., ADA-107 047. 36-073

EXPLOSIVES, COLD WEATHER PERFORM-ANCE, SNOW COVER EFFECT, BLASTING, FROZEN GROUND, RESEARCH PROJECTS.

FROZEN GROUND, RESEARCH PROJECTS.

The possibility of modern warfare being waged under cold weather conditions has raised questions about the effectiveness of conventional and new mine systems during the winter. A wortshop on mine-locuntermine winter warfare was held at the U.S. Army Cold Regions Research and Engineering Laborstory, 21-23 October 1980, to define problems related to cold climates. The designer, developer and user communities sent 22 representatives from 16 organizations outside of CRREL. Discussion papers were prepared by four groups, covering emplacement of mines, mane performance, detection of mines and neutralization of mines. The emphasis was on the unique problems of the winter environment tappears that the U.S. has the capability to conduct defensive warfare during the summer but is not adequately prepared for mine/countermine winter warfare. Test and research programs are called for to compensate for the prior lack programs are called for to compensate for the prior lack of consideration of the winter environment, to adequately winterize new mine/countermine systems, and to formulate appropriate doctrine for defensive winter warfare.

POTHOLE PRIMER—A PUBLIC ADMINISTRATOR'S GUIDE TO UNDERSTANDING AND MANAGING THE POTHOLE PROBLEM. Eaton, R.A., et al, Sep. 1981, 24p., ADA-107 294, 11 refa

Joubert, R.H., Wright, E.A.

36-1114

PAVEMENTS, DEFECTS, ROAD MAINTE-NANCE, FREEZE THAW CYCLES, DAMAGE, FATIGUE

SURFACE DRAINAGE DESIGN FOR AIR-FIELDS AND HELIPORTS IN ARCTIC AND SU-BARCTIC REGIONS.

Lobacz, E.F., et al, Sep. 1981, 56p., ADA-107 293, 40

Bff, K.S. 36-974

AIRPORTS, SURFACE DRAINAGE, ROAD ICING, PERMAPROST DISTRIBUTION, COLD WEATHER CONSTRUCTION, DESIGN CRIT-ERIA, ENVIRONMENTAL IMPACT, HELICOPT ERS. ENGINEERING.

This report presents engineering guidance and design criteria for drainage facilities at Army and Air Force sirrleids and heliports in arctic and subarctic regions. Attention is given to hydrologic criteria, icings, environmental impact, storm drains and design computer programs. A design example and a list of 40 references are included in two

SR 81-23

ELECTROMAGNETIC SUBSURFACE MEAS-UREMENTS.

Dean, A.M., Jr., Oct. 1981, 19p., ADA-108 192. 36-1037

ICE COVER, PROFILES, ELECTROMAGNETIC PROSPECTING, AIRBORNE RADAR, SUBGLA-CIAL OBSERVATIONS, REMOTE SENSING, ICE BOTTOM SURFACE, FRAZIL ICE, ICE JAMS, PERMAFROST, OIL SPILLS.

PERMAFROST, OIL SPILLS.

In 1974 personnel at the U.S. Army Cold Regions Research and Bagineering Laboratory (CRREL) began using an impulse radar system to profile accumulations of ice forms. Through field experience the system has been modified so that it can be effectively used as a profiling system, in a ground or airborne configuration, in certain high-noise environments. The system can penetrate fresh water and media with a high water content. For instance, frazil and brash ice accumulations with approximately 50% water have been profiled to a depth of 25 to 35 ft. As a result of the CRREL modifications, the system has found extensive and varied applications as a low-level remote sensing tool. Applications include profiling ice accumulations (including ice jams), river beds, sheet ice, permafrost, subsurface ice masses, river bank revenients through air-entrained water, snow covers, sea ice, icebergs, and peat bogs. Limited laboratory work has also shown that the impulse radar system may be able to detect oil and gas under sea ice. Selected applications and data are presented. Since it has been used mainly for research, the CRREL system needs further development to make it useful to operational units. Additional development of hardware and software is recommended.

SR 81-24 SITE INVESTIGATIONS AND SUBMARINE SOIL MECHANICS IN POLAR REGIONS.
Chamberlain, E.J., Oct. 1981, 18p., ADA-108 269, 44

36-1644 36-1644
SUBSEA PERMAFROST, SOIL MECHANICS, PROZEN GROUND MECHANICS, OCEAN BOTTOM, OFFSHORE DRILLING, OFFSHORE STRUCTURES, SITE SURVEYS, POLAR REGIONS, BEAUFORT SEA.

Placing oil exploration and production structures offshore in the Alaskan Beaufort Sea will require careful aits investigation and evaluation of submarine soil mechanics. Ico-bounded permafrost occurs widely under the Beaufort Sea floor. Its engineering properties are important to the design of offshore structures. Highly overconsolidated clays also occur widely and interfere with access to gravels for constructing artificial islands. Sites should be selected to avoid ice-rich permafrost. Laboratory tests may need to be conducted to determine the potential hazards of thaw consolidation and weakening. dation and weakening

FOUNDATIONS OF STRUCTURES IN POLAR WATERS

Chamberlain, E.J., Oct. 1981, 16p., ADA-108 344, 29

36-1410

36-1410
OFFSHORE STRUCTURES, FOUNDATIONS,
HYDRAULIC STRUCTURES, OFFSHORE
DRILLING, ARTIFICIAL ISLANDS, ICB LOADS,
SUBSEA PERMAFROST, SEA ICE, SEASONAL
FREEZE THAW, PILE STRUCTURES, SITE SUR-VEYS, BEAUFORT SEA.

VEYS, BEAUFORT SEA.

Artificial islands and gravity- and pile-founded towers used for the exploration and production of petroleum resources in the Alaskan Beaufort Ses will be affected by conditions not found in more temperate waters. The force of sea ice, the thawing of subsea permafrost, and seasonal freezing and thawing all may cause failure of the foundations and fill structures, special precautions must be taken in selecting sites and evaluating the engineering properties of sea bed and fill materials.

SR 81-26

IDENTIFYING AND DETERMINING HALO-CARBONS IN WATER USING GAS CHROMA-TOGRAPHY.

Leggett, D.C., Oct. 1981, 13p., ADA-108 345, 50 refs. 36-1749

WASTES, WATER CHEMISTRY, HYDROCAR-BONS, CHEMICAL ANALYSIS.

BONS, CHEMICAL ANALYSIS.
Since the discovery that chloroform and other haloforms are produced during water chlorination, methods have been needed for their routine analysis. This report describes application of the multiple equilibration headspace technique for the determination of halocarbons in water. This method has certain advantages over solvent extraction and direct injection techniques, including greater sensitivity because of the favorable gas/liquid distribution ratios. It is simpler and faster then purge and trap and resin sorption methods and gives more information about compound identity than single headspace analysis because gas/liquid distribution ratios are determined experimentally. The method is absolute, unlike solvent extraction, resin sorption, purge and trap, and conventional headspace analysis, which require standard additions to correct for incomplete recovery. The use of the technique to analyze chlorinated water samples for haloforms continued to form for 24 hours, even after destruction of chlorine residuals with thiosulfate. Maximum haloform concentrations were observed in undechlorinated samples only after a 48-hour aging period.

SR 81.27

SYNOPTIC METEOROLOGY DURING THE SNOW-ONE FIELD EXPERIMENT.
Bilello, M.A., Nov. 1981, 55p., ADA-109 080, 3 refs.

SYNOPTIC METEOROLOGY, METEOROLOGI-CAL DATA, SNOWFALL, MEASURING IN-STRUMENTS, MAPPING.

STRUMENTS, MAPPING.

The daily atmospheric pressure systems and weather fronts that traversed the northeastern United States during the SNOW-ONE Field Experiment from 11 January through 20 February 1981 are summarized. This experiment is the first in a planned series of measurements to study the influence of atmospheric obscurants on electro-optical system performance. The analysis of the large-scale synoptic patterns that developed during the field test period constitutes a critical component of the research program. The weather during the measurement period included nine new daily high temperature records. January was one of the driest and February was one of the wettest ever observed. These conditions were caused in part by two high pressure cells and two major low pressure systems that crossed the region. One of these lows brought warm air and heavy rain to New England, and the other produced significant snowfall in northern Vermont.

SR 81-28

LAND TREATMENT OF WASTEWATER.
Ryan, J.R., et al, Nov. 1981, 74p., ADA-108 636, Refs.
p.46-49. SITE SELECTION METHODOLOGY FOR THE

Loehr, R.C. 36-1853 WASTE DISPOSAL, WATER TREATMENT. LAND RECLAMATION, STIE ACCESSIBILITY.

A methodology is presented that covers facets of site selection from preliminary screening to field data acquisition for the preparation of a final deeign for a land treatment system. The basic assumption underlying the methodology is an approach to site selection in which the entire study area is investigated for potential sites while considering the whole spectrum of land treatment processes. Due to the extensive nature of such a study, several iterations are required to determine the most feasible site and land treatment alternatives. The methodology is presented in three parts. Level I defines the technical feasibility of implementing land treatment for a particular wastewater problem. The boundaries of the study area are defined and available land areas are rated for their suitability for land treatment based on topography, land use, hydrogeology and soil characteristics. A preliminary deeign for each suitable level I site candidates a prepared in the level II site analysis. The design is based on an evaluation of soil/waste interactions that considers evaluation of wate treatment alternatives and site candidates substitution of the land treatment alternatives and site candidates is developed in level II. The most cost-effective site candidates is then selected for intensive level III field investigations w i determine the design requirements of the land treatment system. LAND RECLAMATION, SITE ACCESSIBILITY. system.

SR \$1-29

MOBILITY BIBLIOGRAPHY.

Liston, N., comp, Nov. 1981, 313p., ADA-108 228. Hutt, M., comp, White, L., comp. 36-1491

TRAFFICABILITY, VEHICLES, BIBLIOGRA-PHIES, TRANSPORTATION, SNOW VEHICLES, AIR CUSHION VEHICLES, TRACKED VEHI-CLES, SNOW STRENGTH, SOIL STRENGTH.

This bibliography is an international compilation of literature relating to terrain vehicles, amphibious vehicles, anow vehicles, air cushion vehicles, tracked vehicles, wheeled vehicles, and off-road vehicles. It also covers the related subjects of

rolling resistance, traction, anow strength measurement, soil strength measurement, terrain analogs, vehicle models, and the overall topic of vehicle mobility. It is not comprehensive but begins at about 1970 and ends in 1980. The Buropean but begins at about 1970 and ends in 1980. The Euro coverage is lacking because much of this material is accessible by computerized literature searching, which the mechanism used for compiling this bibliography.

SR \$1.30 PREDICTING WHEELED VEHICLE MOTION RESISTANCE IN SHALLOW SNOW. Blaisdell, G.L., Dec. 1981, 18p., ADA-147 117, 14

refs.

59-572
RUBBER SNOW FRICTION, SNOW COMPACTION, VEHICLE WHEELS, SNOW DEPTH, SNOW COVER EFFECT, TRAFFICABILITY, VELOCITY, FORECASTING, MATHEMATICAL MODELS.

MODELS.

A vehicle traveling through snow is required to expend a greater amount of energy than is necessary when traveling on a rigid surface. Visually, this energy difference can be explained by the formation of a rut. Various attempts have been made in the past to equate the energy of compaction to vehicle motion resistance. However, many of the previous models use information gathered through the application of a vertical force (with a plate-sinkage device) to predict the horizontal motion resisting force. In an attempt to more accurately quantity the relationship between snow compaction and vehicle motion resistance, a vectorial analysis of compaction by a wheel is performed. A method for separating the compaction due to vehicle weight and forward thrust (horizontal propulsion) is suggested. Two methods of using this compaction force breakdown with field-generated data are proposed for the calculation of vehicle motion resistance in shallow snow.

SR 81-31 ROOF MOISTURE SURVEY: RESERVE CEN-TER GARAGE, GRENIER FIELD, MANCHES-TER, N.H.

Tobiasson, W., et al, Dec. 1981, 18p., ADA-110 135, 6 refs.

Coutermarsh, B.A., Greatorex, A. 36-2430

JO-2-30 WATERPROOFING, MOISTURE, THERMAL INSULATION, WETTABILITY, BITUMENS, INFRARED BQUIPMENT, DRAINS, TEMPERATURE MEASUREMENT, MEASURING INSTRUMENTS.

ING INSTRUMENTS.

An insulated roof with a badly blistered bituminous builtup membrane was surveyed with a hand-held infrared camera to locate areas of wet insulation. Several thermal patterns were observed. Core samples were taken to determine moisture contents. Core samples verified that one thermal smomaly was caused by the increased thickness of bitumen. All other anomalies were caused by wet urethanepertite composite insulation. Some insulation boards contained much more moisture near the edges than at the center, but others were more uniformly wet. Dramatically different thermal patterns resulted. A few nuclear and capacita-ce readings, taken for comparison purposes, showed that extra bitumen adversely affects such sensing methods. Because of the amount of wet insulation and the condition of the membrane both should be removed. The new roofing system for this building should have internal drains and be provided with a sloped surface.

SR 81-32 AUTOMOTIVE COLD-START CARBON MONOXIDE EMISSIONS AND PREHEATER EVALUATION.

Coutts, H.J., Dec. 1981, 37p., ADA-112 170, 7 refs. 36-2751

ENGINE STARTERS, VEHICLES, COLD WEATHER OPERATION, AIR POLLUTION, TEMPERATURE EFFECTS.

TEMPERATURE EFFECTS.

Patrbanks and Anchorage, Alaska, experience high wintertime arbient levels of carbon monoxide (CO). Emissions from starting automobile engines in cold weather are thought to be a major source of CO. A quantitative procedure for determining startup CO was developed. The startup emissions were measured as a function of soak time at several low ambient temperatures. The performance of engine preheaters in reducing the startup CO at the verious soak times and temperatures was estimated. The data scatter was too great to draw any firm conclusions; however, the length of cold-soak time appeared to have a stronger effect on cold-start CO emissions than did soak temperatures (0 to -30C). Compared to no preheat, continuous preheat during an overnight cold soak can reduce the cold-start CO emissions by 20 to 90%.

SR 81-33 EFFECT OF SOIL TEMPERATURE AND PH ON NITRIFICATION KINETICS IN SOILS RE-CEIVING A LOW LEVEL OF AMMONIUM EN-

RICHMENT.
Parker, L.V., et al, Dec. 1981, 27p., ADA-112 171, Refs. p.17-20.
lakandar, I.K., Leggett, D.C.

36-2752

SOIL CHEMISTRY, SOIL TEMPERATURE, NUTRIENT CYCLE, WASTE TREATMENT, SOIL MICROBIOLOGY.

Two soil samples from an on-going field study of land application municipal wastewater were spiked with low levels of
sammonism to determine the effect of temperature on intrification kinetics. The concentrations of ammonium and nitriteplus-nitrate, and the number of autotrophic ammonium and
mitrite oxidizers were monitored periodically during the study.

There was a lag period prior to nitrite-plus-nitrate production
at all temperatures, and the length of this lag period was
temperature-dependent, with the longest period occurring at
the lowest temperature as expected. While nitriteplus-nitrate production appeared logarithmic, suggesting a
growing nitrifler population, the MPB counts of the nitrifiers
did not exhibit logarithmic growth. To study the effect
of soil pH on nitrification kinetics, soil samples from field
plots having the same soil type but different pHs (4.5, 5.5,
and 7.0) were spiked with low levels of ammonium and
the rate of nitrite-plus-nitrate production was greater at pH 5.5 than
at 4.5. Unexpectedly rapid disappearance of ammonium,
mitrite and nitrate, caused by immobilization, obscured the
expected effects of pH on the nitrification rate at the highest
pH.

SR 81-34 SEA ICE RUBBLE FORMATIONS IN THE BER-ING SEA AND NORTON SOUND, ALASKA. Kovacs, A., Dec. 1981, 23p., ADA-113 773, 22 refs.

36-2841
PRESSURE RIDGES, ICE PRESSURE, SEA ICE, OFFSHORE STRUCTURES, ICE LOADS, ICE FORMATION, ICE SURFACE, OFFSHORE DRILLING, GROUNDED ICE, FLOATING ICE. The occurrence of large, compact, grounded pressure ridge formations up to 15 m high in the coastal waters of Norton Sound and the Bering Sea is discussed. These formations periodically float free and drift about, gouging the seabed. Their mass makes them a severe threat to both floating and bottom-founded structures in these waters.

SR 82-01 OVERVIEW OF MODELS USED IN LAND TREATMENT OF WASTEWATER. Iskandar, I.K., Mar. 1982, 27p., ADA-114 403, Refs. p.22-27. 36-2910

36-2910
LAND RECLAMATION, WASTE TREATMENT,
WATER TREATMENT, NUTRIENT CYCLE,
MATHEMATICAL MODELS, SOIL MICROBIOLOGY, SOIL WATER, SOIL CHEMISTRY.

OLOGY, SOIL WATER, SOIL CHEMISTRY.

This report summarizes the state of the art of the modeling of wastewater renovation by land treatment. The models discussed are classified based on their use for planning, site selection and cost analysis, and for predicting 1) water and salt transport in soils, 2) nitrogen transport and transformations, 3) phosphorus transport and transformations, 4) virus movement in soils, and 5) toxic metal and trace organic movement in soils.

This report compares the different models as to their purpose, input and output data, and status of validation.

In addition, the report includes a section on research needs for modeling land treatment of wastewater.

SR 82-02 TESTING SHAPED CHARGES IN UNFROZEN AND FROZEN SILT IN ALASKA. Smith, N., Mar. 1982, 10p., ADA-113 670, 2 refs. EXPLOSION EFFECTS, BLASTING, FROZEN GROUND STRENGTH, SOIL STRENGTH, BOREHOLES, TESTS.

SR 82-03 SECOND NATIONAL CHINESE CONFERENCE ON PERMAFROST, LANZHOU, CHINA, 12-18 OCTOBER 1981.

Brown, J., et al, Mar. 1982, 58p., ADA-114 445. Yen, Y.-C.

PERMAFROST, FROZEN GROUND, RE-SEARCH PROJECTS, MEETINGS, GEO-CRYOLOGY, CHINA.

The Second National Chinese Conference on Permafrost was attended by the authors, and visits were made to two research institutes in Lanzhou, the Northwest Institute of the China Academy of Railway Sciences and the Institute the China Academy of Railway Sciences and the Institute of Giaciology and Cryopedology. Approximately 100 papers were presented at the conference and 180 abarracts were published. The papers were presented during three assessions:

1) Distribution, Characteristics and Formation of Frozen Ground, 2) Basic Physico-Mechanical Properties and Processes in Frozen Soils, and 3) Ragineering Design and Construction in Permafrost. Sixty-nine institutions conducting frozen ground research in China were represented. It was planned to present selected papers from this conference at the Fourth International Conference on Permafrost in Fairbanks, Alaska, in 1983.

SR 82-04
PRELIMINARY ASSESSMENT OF THE NUTRI-ENT FILM TECHNIQUE FOR WASTEWATER TREATMENT.

Bouzoun, J.R., et al, Mar. 1982, 15p., ADA-115 425, 12 refs.

36-3112 WASTE TREATMENT, WATER TREATMENT, SANITARY ENGINEERING, PLANTS (BOTA-NY), GROWTH, STATISTICAL ANALYSIS.

NY), GROWTH, STATISTICAL ANALYSIS. An experiment was conducted to determine the feasibility of using a solar powered, self-regenerating plant growth system, called the nutrient film technique (NFT), to treat primary effluent (average temperature, 11.1C). Primary effluent was pumped onto the elevated end of a sloping waterproof 2-x40-ft plywood tray and trickled through the root mat of reed canarygrass. The quantity of influent and effluent was measured as well as temperature, pH, total suspended solids, volatile suspended solids, BODS, total nitrogen, ammonia nitrogen, nitrate nitrogen, total phosphorus, phosphate phosphorus, and fecal coliform organisms. The quantity and quality of the reed canarygrass was determined from samples taken from six harvests. Mass balances are presented for BODS, total suspended solids, total nitrogen, ammonia nitrogen, total phosphorus, and phosphate phosphorus. The removal of several volatile trace organic compounds was determined on two separate dates.

SR 82-05 PLANT GROWTH AND MANAGEMENT FOR WASTEWATER TREATMENT IN OVERLAND FLOW SYSTEMS.

Palazzo, A.J., Apr. 1982, 21p., 25 refs. 36-3113

WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, PLANTS (BOTANY), GROWTH, GRASSES.

OROW III, ORANSES.

Domestic wastewater was applied over a four-year period at various rates to three overland flow test slopes to study forage grass growth and nutrient removal. The annual application rates of nitrogen and phosphorus ranged up to 2026 and 226 kg/ha, respectively. The forage grasses were harvested three times per season—sition and uptake of nutrients were determined. The results show that reed cannarygrass, quaekgrass and Kentucky bluegrass were the most persistent grasses on the slope over the four

SR 82-06 METEOROLOGICAL CONDITIONS CAUSING MAJOR ICE JAM FORMATION AND FLOOD-ING ON THE OTTAUQUECHEE RIVER, VER-MONT

Bates, R., et al, May 1982, 25p., ADA-116 386, 15 refs.

Brown, M.-L. 39-873

ICE JAMS, FLOODING, METEOROLOGICAL FACTORS, ICE BREAKUP, RIVER ICE, RIVER FLOW, PRECIPITATION (METEOROLOGY), UNITED STATES—VERMONT—OTTAUQUE-CHEE RIVER.

This report discusses wintertime meteorological conditions that can induce rapid ice breakup, ice jam formation and subsequent flooding. These conditions, described for the Ottauquechee River in Vermont, abould be representative of those for similar unregulated river systems in northern temperate regions. temperate regions. Summer flood conditions are compared to those during winter floods, when river ice is the main impediment to water flow. Comparisons are made for total precipitation, stage height and the synoptic meteorological

MOISTURE DETECTION IN ROOFS WITH CELLULAR PLASTIC INSULATION—WEST POINT, NEW YORK, AND MANCHESTER, NEW HAMPSHIRE.

Korhonen, C., et al, May 1982, 22p., ADA-117 872, 6 refs.

Coutermarsh, B.A. 36-3924

MOISTURE DETECTION, ROOFS, CELLULAR PLASTICS, THERMAL INSULATION, THERMAL REGIME, INFRARED PHOTOGRAPHY.

MAL REGIME, INFRARED PHOTOGRAPHY.

New rook with cellular plastic insulation and a bituminous built-up membrane were surveyed with a hand-held infrared camera to determine its effectiveness in detecting damp and wet insulation. Wet areas were found and defined with the help of 2-in-diam. core samples. The results of the tests showed the infrared camera can be useful and effective as an inspection tool within the time constraints of the typical one-year warranty period. The tests also underlined the importance of core samples for verification.

SR 82-08 SNOW-ONE-A; DATA REPORT.

Aitken, G.W., ed, May 1982, 641p., ADB-068 569, For selected papers see 37-1095 through 37-1107.

SNOWFALL, SNOWSTORMS, SNOWFLAKES,

SNOWFALL, SNOWSTORMS, SNOWFLAKES, BLECTROMAGNETIC PROPERTIES, METEOROLOGICAL DATA, WAVE PROPAGATION, MILITARY OPBRATION, VISIBILITY. This report contains the data obtained during the SNOW-ONE-A Field Experiment. All of the data suitable for presentation in this format are included with the exception of the results from a very few measurement programs whose data could not be provided in time. The report includes meteorological measurements made by CRREL and ASI, snow characterization data from CRREL, APGL and ASI, snow characterization data from CRREL, APGL and ASI, optimetrics, NRL, APGL and Photometrics, millimster wavelength propagation measurements made by BRL; and target/background data from Optimetrics. The SNOW-ONE-A Field Experiment was the second in a planned series conducted by the Cold Regions Research and Engineering Laboratory for the Directorate of Research and Development of the U.S. Army Corps of Engineers. It was conducted at CEATC, Jericho, Vermont from 30 Nov. 1981 to 23 Feb. 1982. Feb. 1982.

SR 82-09 CRREL 2-INCH FRAZIL ICE SAMPLER. Rand, J.H., May 1982, 8p.

36-3744 FRAZIL ICE, WEDDELL SEA SAMPLERS, ANTARCTICA—

WEDDELL SEA.

The CRREL 2-inch frazil ice sampler is a tubular device for obtaining undisturbed samples of frazil ice from beneath a floating ice cover. It fits through a 2 1/2 in-diameter hole drilled in the ice. A liquid-tight seal at the bottom of the sampler prevents the loss of frazil ice and/or water from the tube while the unit is being raised. The sampler was used for the first time in the floes in the Weddell Sea, Antarctica in austral summer, 1980-1981. (Auth. mod.)

EVALUATING THE HEAT PUMP ALTERNA-TIVE FOR HEATING ENCLOSED WASTEWA-TER TREATMENT FACILITIES IN COLD RE-**GTONS**

Martel, C.J., et al, May 1982, 23p., ADA-116 385, 11 refs.

Phettenlace, G.R.

39-1259
HEAT RECOVERY, WASTE TREATMENT, WATER TREATMENT, PUMPS, COST ANAL-

Table.

This report presents a five-step procedure for evaluating the technical and economic fessibility of using hest pumps to recover heat from treatment plant effluent. The procedure is meant to be used at the facility planning level by engineers who are unfamiliar with this technology. An example of the use of the procedure and general design information are provided. Also, the report reviews the operational experience with heat pumps at wastewater plants located in Fairbanks, Alaska, Madison, Wisconsin, and Wilton, Maine.

SR 82-11 SNOWPACK PROFILE ANALYSIS USING EX-TRACTED THIN SECTIONS.

Harrison, W.L., May 1982, 15p., ADA-117 839, 3 refs. 36-3925 SNOW SURVEY TOOLS, PROFILES, EQUIP-

MENT. A method is presented for obtaining snow profiles for analysis. The method and required equipment replace former methods such as the "roaring bonfire" technique and the use of

CIN 34-14 EFFECTS OF INUNDATION ON SIX VARIE-TIES OF TURFGRASS. Brbisch, F.H., et al, May 1982, 25p., ADA-117 838, Refs. p.17-25.

Stark, K.L.

36-4002 GRASSES, GROWTH, FLOODING, DAMAGE, PLANT PHYSIOLOGY, TESTS.

PLANT PHYSIOLOGY, TESTS.
Six cold-adapted grasses were given ten-day dark and inundation stress treatments. Nugget Kentucky bluegrass grown in soil or gravel exhibited the best survival. Sydsport bluegrass did well in gravel. Meadow forstall and manchar brome survived the treatments when grown in silt soil, but did not when grown on gravel soil. Rhizomes were regenerated by most of the grasses. Root transverse sections did. The damage in the sections are sections did. The damage in the sections paralleled that observed macroscopically. Electrophoretic analysis for the peroxidase enzyme complex showed significant banding pattern differences before external damage was visible. This technique may prove to be a diagnostic tool for determining stress damage. Seedlings of all grasses except sydsport bluegrass survived a 15-day inundation.

SR 22-13

IMPROVING ELECTRIC GROUNDING IN FROZEN MATERIALS.

Delaney, A.J., et al, June 1982, 12p., ADA-117 873,

Seilmann, P.V., Arcone, S.A.

PERMAPROST PERMAPROST PHYSICS, ELECTRICAL GROUNDING, ELECTRICAL RESISTIVITY, SA-LINE SOILS, GRAIN SIZE, ELECTRIC CHARGE, FROZEN GROUND PHYSICS, TESTS.

FROZEN GROUND PHYSICS, TESTS.

This study shows that resistance to ground of a simple vertical electrode in frozen fine-grained soil can be lowered significantly by placing it in a hole backfilled with a conductive soil-salt mixture. These tests were performed near Fairbanks, Alaska, in perennially frozen silt. Three electrodes were installed in holes created by detonating standard military shaped charges placed at the ground surface. The backfill contained varying amounts of salt. Measurement of resistance to ground of each electrode was made seasonally. The resistance to ground was lowered by an order of magnitude by the addition of a water-saturated salt-soil backfill. Improvement persisted six months after the backfill was placed and allowed to freeze. The degree of improvement provided by this technique will be a function of grain size and permeability of the surrounding soil.

SR \$2-14 EVALUATION OF A SIMPLE MODEL FOR PREDICTING PHOSPHORUS REMOVAL BY SOILS DURING LAND TREATMENT OF WAS-

TEWATER. Ryden, J.C., et al, June 1982, 12p., ADA-117 848, 35

Syers, J.K., Iskandar, I.K.

36-4092

WASTE TREATMENT, WATER TREATMENT, SOIL CHEMISTRY, FORECASTING, LANI RECLAMATION, MATHEMATICAL MODELS.

RECLAMATION, MATHEMATICAL MODELS. This report evaluates a simple P balance model to predict site longevity with respect to P removal during land treatment of wastewater. The model is based on measured inputs and outputs of P at the treatment site and on an estimate of the P storage capacity of the soil profile. Sorption P by three soils used for land treatment conformed to the P sorption model based on a generalized isotherm. Laboratory sorption tests were used to predict P storage capacity of the soil profiles at a solution P concentration equivalent to that in the effluent applied to the soil. For two soil profiles the P balance model predicted site longevities of approximately 50 and 210 years. The existing depth of P enrichment in these profiles predicted from the model agreed closely with measurements of P enrichment based on amounts of NaOH-extractable P and on measured soil solution P concentrations.

SR 82-15 LIMNOLOGICAL INVESTIGATIONS: LAKE **EOOCANUSA, MONTANA. PART 4: FACTORS CONTROLLING PRIMARY PRODUCTIVITY.** Woods, P.F., et al, June 1982, 106p., ADA-119 328, Refs. p.54-63.

Falter, C.M.

BIOMASS, RESERVOIRS, LIMNOLOGY, DAMS, PHOTOSYNTHESIS, LAKE WATER, WATER

Postimpoundment loadings of total nitrogen and total phos-phorus delivered to Lake Koccanusa by the principal inflowing stream, the Koctensi River, were predicted to be large enough to cause eutrophication of the lake; however, measured annual to cause europhication of the lake; however, measured annual primary productivity for 1972 through 1075 was relatively low, and characteristic of oligotrophic values because phytoplankton photosynthesis was suppressed by physical limnological factors. The predominant flood-control function of the reservoir necessitates substantial reductions in volume during the autumn and winter. These large-scale water movements weakened the thermal structure of the reservoir.

SR 82-17

SR 87-17 ¿PROCEEDINGS₁. Snow Symposium, 1st, Hanover, NH, August 1981, June 1982, 324p., ADB-091 442, Refs. passim. For individual papers see 40-1928 through 40-1946. 40-1927

SNOW SURVEYS, SNOWFALL, BLOWING SNOW, MILITARY OPERATION, SNOW OPTICS, SNOW ACOUSTICS, TRANSMISSION, MEETINGS, SCATTERING, SNOW WATER EQUIVALENI, INFRARED RADIATION, VISI-BILITY. SR 82-18

PROCEEDINGS OF A WORKSHOP ON THE PROPERTIES OF SNOW, 8-10 APRIL 1981, SNOWBIRD, UTAH.

Brown, R.L., ed, 1982, 135p., ADA-120 517, Refs. passim. For individual papers see 36-2530 through 36-2535 and 39-1718. Includes committee chairmen's reports.

Colbeck, S.C., ed, Yong, R.N., ed.

39-1717
SNOW PHYSICS, SNOW SURVEYS, METAMOR-PHISM (SNOW), SNOW MECHANICS, SNOW ACCUMULATION, SNOW OPTICS, SNOW ELECTRICAL PROPERTIES.

SR 82-19 CHEMICAL OBSCURANT TESTS DURING WINTER; ENVIRONMENTAL FATE.

Cragin, J.H., Aug. 1982, 9p., ADB-068 594, 3 refs. 37-733

ABROSOLS, SNOW COMPOSITION, SNOW SURFACE, AIR POLLUTION, CHEMICAL PROPERTIES, SMOKE GENERATORS.

ERTIES, SMOKE GENERATORS.

Concentrations of orthophosphate, IR1 and IR2 obscurants were measured in surface snow samples after a winter test of white phosphorus (WP) smoke and the two infrared acreesers. Sample concentrations of IR1 and IR2 decreased exponentially downwind from the smoke release point. Orthophosphate concentrations were all lower than the analytical detection limit of 0.15 mg/L. Quantities of smoke released pose no hazard to the public or environment. Snow was found to provide a clean non-contaminating surface upon which to collect the deposited aerosol. SR 82-20

BIBLIOGRAPHY OF LITERATURE ON CHINA'S GLACIERS AND PERMAFROST. PART 1:

Shen, J., ed, Sep. 1982, 44p., ADA-122 399. Zhang, X., ed. 37-2371

GLACIER SURVEYS, PERMAFROST, GLACI-OLOGY, SNOW SURVEYS, ICE SURVEYS, BIB-LIOGRAPHIES, AVALANCHES, MUDFLOWS, REMOTE SENSING, MAPPING, ISOPTOPE ANALYSIS, CHINA.

ANALYSIS, CHINA.

This report is a translation of a book received by USACRREL as part of its cooperative program with the Institute of Glaciology and Cryopedology, Academia Sinica, People's Republic of China. The bibliography covers the following topics: glaciers by geographic regions, applied glaciology including snow, avalanches, and river ice, permafrost (cryopedology), mud flows, and survey techniques including mapping, remote sensing, and isotope analyses. A list of Chinese journals is included.

SER 94.21

SR 82-21 LIMNOLOGICAL INVESTIGATIONS: LAKE EMNOITOGICAL INVESTIGATIONS: LAKE EOOCANUSA, MONTANA. PART 1: PRE-IM-POUNDMENT STUDY, 1967-1972. Bonde, T.J.H., et al, Oct. 1982, 184p., ADA-119 632, Refs. p.76-78.

Bush R.M 39-1260

LIMNOLOGY, LAKE WATER, DAMS, WATER POLLUTION, RESERVOIRS, NUTRIENT CYCLE, UNITED STATES—MONTANA— KOOCANUSA, LAKE.

KOCCANUSA, LAKE.

This report documents the effects of the construction of Libby Dan upon the water quality of the United States portion of the Kootenai River during the pre-impoundment phase of a long-term water quality study. Water quality problems during dam construction appeared to be restricted to short-term increases in suspended sediment and turbidity which suppressed the aquatic insect population in the river downstream. Abnormally high background concentrations and abrupt chemical changes in water quality during the course of the study were attributed to industrial discharges from a fertilizer plant and mining operation located on an upstream tributary to the river. Nutrient loadings of nitrogen and phosphorus were found to be of sufficient magnitude to predict the development of eutrophic conditions following impoundment suggesting that efforts in controlling nutrient point sources be continued.

SR 82-22

SR 82-22 SM 52-22 SUPPRESSION OF ICE FOG FROM THE FORT WAINWRIGHT, ALASKA, COOLING POND. Walker, K.E., et al, Oct. 1982, 34p., ADA-123 069, 28

Brunner, W. 39-1729

39-1729
ICE FOG, VISIBILITY, COUNTERMEASURES, PONDS, COOLING SYSTEMS, AIR TEMPERATURE, VEHICLES, ACCIDENTS.
Ice fog near the Pt. Wainwright cooling pond creates a visibility hazard. Observations show a substantial reduction in visibility along both private and public roadways in the path of the cooling pond's ice fog plume. This reduction in visibility increases as the ambient air temperature decreases. Visibility was less than 215 m (700 ft) on the Richardson Highway on the average of 8 days for each of the 3 data years. Data collected during the winters of 1979-80, 1980-

81 and 1981-82 statistically show that use of a monomolecular film evaporation suppressant, hexadecanol, on the pond to reduce ice fog is ineffective. There is an immediate need for a driver warning system when visibility is affected by the ice fog.

LIMNOLOGICAL INVESTIGATIONS: LAKE KOOCANUSA, MONTANA. PART 3: BASIC DATA, POST-IMPOUNDMENT, 1972-1978. Storm, P.C., et al, Nov. 1982, 597p., ADA-124 454, 8

Bonde, T.J.H., Bush, R.M., Helms, J.W. 38-4080

JE-4080
LIMNOLOGY, LAKE WATER, WATER CHEMISTRY, WATER POLLUTION, RESERVOIRS, RIVERS, STATISTICAL ANALYSIS, WASTE DISPOSAL, WATER TREATMENT, WATER TEMPERA-TURE, UNITED KOOCANUSA, LAKE. STATES-MONTANA

KOOCANUSA, LAKE.

Study of Lake Koocanuse, Montana (the reservoir formed by impoundment of the Kootenai River by Libby Dam in 1972), was undertaken in 1972 as a continuation of pre-impoundment studies of the Kootenai River underway since 1967. This report presents the water quality-limnological data compiled by the Corps of Engineers from 1972 through 1978. Additional information was provided by the British Columbia Ministry of Environment, Waste Management Branch, and the Water Survey of Canada. The data are presented in tabular form. No analyses are included.

SR 82-24 ENERGY CONSERVATION AT THE WEST DOV-ER, VERMONT, WATER POLLUTION CON-TROL FACILITY.

Martel, C.J., et al, Nov. 1982, 18p., ADA-123 170, 4

rens.
Sargent, B.C, Bronson, W.A.
37-2372
WATER TREATMENT, WATER POLLUTION,
SEWAGE TREATMENT, WASTE TREATMENT,
ENVIRONENTAL PROTECTION, COST ANAL-

YSIS.

An energy audit was conducted at the West Dover, Vermont, water pollution control facility. The audit revealed that seration, not pumping to the land treatment site, was the largest energy consumer. As a result of the audit, five Baergy Conservation Opportunities (BCC) were evaluated. Three of the BCOs were recommended for implementation; these could result in annual savings of more that \$6000. The remaining two ECOs were not recommended because of a large capital investment required and a long payback retried.

SR 82-25 METHOD FOR MEASURING ENRICHED LEV-ELS OF DEUTERIUM IN SOIL WATER. Oliphant, J.L., et al, Nov. 1982, 12p., ADA-123 070,

10 refs.

37-2373

Jenkins, T.F., Tice, A.R. 38-4039

38-4039

SOIL WATER, HYDROGEN, ISOTOPES, HEAVY WATER, SPECTROSCOPY, ACCURACY.

This report describes procedures for analyzing hydrogen isotope ratios. Hydrogen is separated from liquid water or soil water by reacting the water with heated wanium. An isotope-ratio mass spectrometer determines the atom % deuterium in the hydrogen to a precision of 0.0075. Ways of upgrading the mass spectrometer to obtain better precision are also discussed.

SR 82-26 USER'S INDEX TO CRREL LAND TREATMENT COMPUTER PROGRAMS AND DATA FILES. Berggren, P.A., et al, Nov. 1982, 65p., ADA-123 172, Refs. p.56-65. Iskandar, I.K.

WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, COMPTUER PRO-GRAMS.

GRAMS.

This user's index is a directory for the computer programs and data files developed at CRREL on land treatment of wastewater. Two computers are used, a Prime 400 located at CRREL and the Dartmouth Time Sharing System (DTSS) located at Dartmouth College, Hanover. New Hampshire. The objective of this directory is to allow users to locate and use or request desired programs of data files, to maintain a permanent record of programs and data files developed under the land treatment program, and to assist in technology transfer. Appendix A contains a list of published papers and technical reports related to the computer programs and the data files. The program or file of concern is listed at the end of each citation.

SR 82-27 PILOT-SCALE EVALUATION OF THE NUTRI-ENT FILM TECHNIQUE FOR WASTEWATER TREATMENT.

Bouzoun, J.R., et al, Nov. 1982, 34p., ADA-123 429, 12 refs.

Diener, C.J., Butler, P.L.

38-4383

WASTE TREATMENT, WATER TREATMENT, CHEMISTRY, NUTRIENT CYCLE, PLANT PHYSIOLOGY, WATER RETENTION.

PHYSIOLOGY, WATER RETENTION.

An experiment was conducted to determine the feasibility of using several plant species in a pilot-scale nutrient film technique (NFT) installation to further treat primary-treated effluent. The reduction of biochemical oxygen demand, total suspended solids, and nitrogen and phosphorus concentrations by the NFT is discussed. Tracer studies aboved that the hydraulic retention time of the wastewater in the NFT trays was inversely related to the wastewater application rate, and that for a given flow, plants with fine root systems (such as reed canarygrass) had a much longer detention time than plants with coarse tuberous rhizomes (such as cattails). The BOD reduction could be described using the plug-flow reactor model with first-order kinetics.

SR 22-28 PHYSICAL PROPERTIES OF THE ICE COVER OF THE GREENLAND SEA.

Weeks, W.F., Nov. 1982, 27p., ADA-123 712, 3 refs.

37-2374
ICE PHYSICS, SEA ICE, ICE STRUCTURE, ICE COMPOSITION, ICE MECHANICS, ICE FRICTION, ICE ADHESION, ICE ELECTRICAL PROPERTIES, ICE THERMAL PROPERTIES, FAST ICE, PACK ICE, GREENLAND SEA.

PAST ICE, PACK ICE, GREENLAND SEA.

There is very little information available on the physical properties of the ice cover of the Greenland Sea. This paper reviews what is known about the different types of ice that are believed to occur in this area. It also discusses how the internal structure and composition of these ice masses may differ from those of the more extensively studied ice of the Beaufort Sea and identifies gaps in the present knowledge of the properties of such ice masses (regardless of places of origin). Finally a strategy is outlined for efficiently studying the properties of the ice in the Greenland Sea by combining structural and compositional characterization with limited property determinations.

BASELINE WATER QUALITY MEASURE-MENTS AT SIX CORPS OF ENGINEERS RESERVOIRS, SUMMER 1981.

Parker, L.V., et al, Dec. 1982, 55p., ADA-125 440, 13

Jenkins, T.F., Brockett, B.E., Butler, P.L., Cragin, J.H., Govoni, J.W., Keller, D.B. 37-3495

RESERVOIRS, WATER CHEMISTRY, WATER POLLUTION, CHEMICAL ANALYSIS, WATER TEMPERATURE, SUSPENDED SEDIMENTS.

TEMPERATURE, SUSPENDED SEDIMENTS.

Water quality information was collected at six reservoirs of the New England Division, U.S. Army Corps of Engineers, during the summer and fall of 1981. The reservoirs tested included Ball Mountain in Jamaica, Vermont, Everett and Hopkinton-Elm Brook in Hopkinton, New Hampshire, North Hartland in North Hartland, Vermont, Stoughton Pond and North Springfield, Vermont, and Townshend, Vermont. Field measurements includate the contract of the contraction of the contractio shend in Townshend, Vermont. Field measurements included temperature, pH, conductivity, dissolved oxygen, depth, and the point of visual extinction. Laboratory analyses included determination of total suspended matter, turbidity, alkalinity, ammonium, nitrate, orthophosphate, total phosphorus, total nitrogen, total organic carbon, heavy metala (Zn, Pb, Cd and Cr), fecal coliforms, and chlorophyll a

SR 82-31 RESERVOIR BANK EROSION CAUSED AND INFLUENCED BY ICE COVER.
Gatto, L.W., Dec. 1982, 26p., ADA-124 508, Refs.

p.20-26. 38-4040

BANKS (WATERWAYS), SOIL EROSION, ICE EROSION, RESERVOIRS, ICE COVER EFFECT, EROSION, WATER LEVEL, BEACHES.

EROSION, WATER LEVEL, BEACHES.
The purpose of this study was to evaluate the importance of reservoir bank erosion caused by an ice cover. The evaluation is based on a literature review and on inferences made from field observations and experience. Very little is known about the amount of reservoir bank erosion caused by the actions of an ice cover, although considerable information is available on the processes of ice-related erosion along the shorelines or beaches of oceans, rivers or lakes. The importance of ice-related erosion along a reservoir bank seems to be determined primarily by water level. If the reservoir water level is high enough for ice to act directly on the bank face, the amount of erosion caused by ice could be substantial. If the water level is below the bank, ice would have no direct effect on it. However, ice could indirectly increave bank instability by disrupting and eroding nearshore and beach zones, which could lead to bank erosion.

SR 82-32 DEVELOPING A WATER WELL FOR THE ICE BACKFILLING OF DYE-2.

Rand, J.H., Dec. 1982, 19p., ADA-125 503, 11 refs. 39-1730

WATER SUPPLY, ICE MELTING, WELLS, LOG-ISTICS, GREENLAND.

One proposal to extend the useful life of DEW Line Ice Cap Station DYE-2 is to backfill the lower 50 feet of the truss enclosure with ice. This report discusses a method by which 2.8 million gallons of water would be collected and stored by melting ice. Also included is a description of required components, their costs and the logistical requirements to establish such a system.

SR 82-33

INFRARED INSPECTION OF NEW ROOFS. Korhonen, C., Dec. 1982, 14p., ADA-125 502, 9 refs.

PHOTOGRAPHY, THERMAL INSULATION, BUILDINGS.

BUILDINGS.

The feasibility of using infrared cameras to detect wet insulation during the typical 1-year warranty period for new Army roofs was studie. Both the ability to gain moisture and the manner of westing of insulations were of major concern. Although some insulations take on moisture much slower that others, 8 to 10 months usually is ample time for most insulations to absorb enough moisture to be detectable by an infrared camera. However, the early signs of this moisture as seen with the infrared camera differ with insulation type. Basically, boards of slower-wetting cullular plastic insulations initially wet at their perimeters, whereas highly absorbent fibrous insulations tend to wet more or less uniformly. An infrared camera is well suited for finding the typically small and sometimes irregularly ahaped wet areas on a new roof. A specification incorporating this technology should be now tested. now tested.

SR 83-01
USING THE DWOPER ROUTING MODEL TO SIMULATE RIVER FLOWS WITH ICE. Daly, S.F., et al, Jan. 1983, 19p., ADA-125 439, 10

Ashton, G.D. 37-2487

RIVER FLOW, RIVER ICE, ICE COVER EFFECT, ICEBOUND RIVERS, FLOODS, FLOW RATE, MATHEMATICAL MODELS.

MATHEMATICAL MODELS.

The flow routing model of the National Weather Service entitled DWOPER (Dynamic Wave Operational Porecast Program) is examined with regard to the modifications required to include the effect of river ice on the flow variables of water level and discharge.

Difficulties in modeling the ice effects are described. Example model output is presented showing the transient effects introduced by imposition of removal of the ice cover from and otherwise uncovered flow.

CREEL INSTRUMENTED VEHICLE: HARD-WARE AND SOFTWARE,
Blaisdell, G.L., Jan. 1983, 75p., ADA-128 713.

38-4041
TIRES, VEHICLES, LOADS (FORCES), SURFACE
PROPERTIES, TESTS, COMPUTER PROGRAMS,
MEASURING INSTRUMENTS, MAINTENANCE, VELOCITY.

NANCE, VELOCITY.

This report gives a detailed description of the CRREL Instrumented Vehicle (CIV). The CIV is equipped with instrumentation to measure three mutually perpendicular forces acting at the interface between the front tires and any surface material. In addition, accurate wheel and vehicle speeds and rear sale torque are measured. The vehicle is equipped for front-wheel, rear-wheel or four-wheel drive. A dual brake system allows front-, rear- or four-wheel braking. A minicomputer-based data acquisition system is installed in the vehicle to control data gathering and to process the data. The software for data acquisition and manipulation and the interfacing techniques required are described.

SR 83-04 SNOW SYMPOSIUM 2; U.S. ARMY COLD RE-GIONS RESEARCH AND ENGINEERING LABORATORY, HANOVER, NEW HAMP-

LABORATORY, HANGYER, NEW HAMISHIRE, AUGUST 1982, VOL.1. Snow Symposium, 2nd, Hanover, NH, August 1982, Mar. 1983, 295p., ADB-073 046, Refs. passim. For individual papers see 38-4305 through 38-4325.

38-4304 SNOW PHYSICS, SNOW CRYSTAL STRUC-TURE, SNOWFALL, BLOWING SNOW, SNOW OPTICS, INFRARED RADIATION, LIGHT TRANSMISSION, LIGHT SCATTERING, VISIBILITY, MODELS, MEETINGS. SR 83-05

FROZEN SOIL CHARACTERISTICS THAT AF-FECT LAND MINE FUNCTIONING. Richmond, P.W., Apr. 1983, 18p., ADA-144 308, 10

39-96

MILITARY OPERATION, FROZEN GROUND MECHANICS, EXPLOSION EFFECTS, LOADS (FORCES), MINES (ORDNANCE), FREEZE THAW CYCLES, STRESSES, FROZEN GROUND TEMPERATURE, TENSILE PROPERTIES, WATER CONTENT.

WAIER CONTENT.

This report discusses the results of an experiment to determine the effect of five factors on the load transferred through frozen soil to a buried land mine. The five variables examined were load, temperature, number of freeze-thaw cycles, soil, and water content. Analysis of a half-fraction factorial experiment shows that no one variable can be used as a predictor of mine functioning performance.

SR 83-06

OPTIMIZATION MODEL FOR LAND TREAT-MENT PLANNING, DESIGN AND OPERA-TION. PART 1. BACKGROUND AND LITERA-TURE REVIEW.

Baron, J.A., et al, Apr. 1983, 35p., ADA-134 554, Refs. p.31-35.

Lynch, D.R., Iskandar, I.K. 38-882

LAND RECLAMATION, WASTE TREATMENT, WATER TREATMENT, MODELS, DESIGN, NUTRIENT CYCLE, SEASONAL VARIATIONS, AGRICULTURE.

AGRICULTURE.

The material presented in Part I is intended to provide insight into the possible land treatment planning objectives, the status of land treatment research and implementation, the renovative processes that occur in the various components of these systems, and the potential for optimizing the configuration of these components. The structure and application of nine models, which include methods to optimize the regional planning, design and operation of slow-rate land treatment systems, are briefly discussed. General comments follow on the overall status of research in land treatment modeling and design and directions for future work.

SR 83-07 OPTIMIZATION MODEL FOR LAND TREAT-MENT PLANNING, DESIGN AND OPERA-TION. PART 2. CASE STUDY.

Baron, J.A., et al, Apr. 1983, 30p., ADA-134 513, 14

Lynch, D.R., Iskandar, I.K. 38-883

WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, DESIGN, MODELS, NUTRIENT CYCLE, AGRICULTURE.

NUTRIENT CYCLE, AGRICULTURE.

A procedure to evaluate design and operating options for slow-rate land treatment systems is demonstrated. The nonlinear optimization model LTMOD is used to generate optimal monthly operating regimes (effluent application patterns) and to define optimal design configurations (combinations of storage capacity and irrigation area). The model is applied to a hypothetical slow-rate land treatment system in a cool, humid area with a forage crop, where the operation and design of the system is constrained by the potential for nitrogen renovation in the storage facility and in the soil-crop system. The cost properties over the range of optimal design alternatives are examined to deduce some general cost characteristics of slow-rate systems ranging from 0.5 to 10 mgd.

SR 83-08 OPTIMIZATION MODEL FOR LAND TREAT-MENT PLANNING, DESIGN AND OPERA-TION. PART 3. MODEL DESCRIPTION AND USER'S GUIDE.

Baron, J.A., et al, Apr. 1983, 38p., ADA-134 461, 4 refa.

Lynch, D.R. 38-884

WASTE TREATMENT, LAND RECLAMATION, WATER TREATMENT, MODELS, DESIGN.

A nonlinear optimization model applicable to slow-rate land treatment systems in cool, humid regions is described. The model prescribes optimal design variables as well as an operating schedule for a facility comprising a storage lagoon with bypass and a single-crop irrigation system. The optimization is achieved by use of generalized, commercially available software that embodies the reduced gradient method. The model enusirous are presented. model equations are presented. The computational structure as implemented on the CREL Prime System is described, with instruction for use. A sample problem illustrates model application, and a program listing is appended.

SR 83-09 CORPS OF ENGINEERS LAND TREATMENT OF WASTEWATER RESEARCH PROGRAM: AN ANNOTATED BIBLIOGRAPHY.

Parker, L.V., et al, Apr. 1983, 82p., ADA-130 136. Berggren, P.A., Iskandar, I.K., Irwin, D., McDade, C., Hardenberg, M.

WASTE TREATMENT, WATER TREATMENT, SANITARY ENGINEERING, LAND RECLAMA-TION, BIBLIOGRAPHIES.

IIUN, BIBLIUGRAPHIES.
This bibliography contains publications of research funded in whole or in part by the Corps of Engineers Land Treatment Research Program, conducted from January 1972 to May 1982.
The program was officially complete in October 1980. Six types of publications are included: 1) publications in open literature (which may include papers in journals, chapters in books and books), 2) technical reports, 3) engineer technical letters, 4) draft translations (mainly from Russian), 5) theses and dissertations (M.S., Ph.D.), and 6) presentations at scientific conferences.

SYNOPTIC METEOROLOGY DURING THE SNOW-ONE-A FIELD EXPERIMENT.
Biello, M.A., May 1983, 80p., ADA-134 888, 8 refs.

38-885

38-865 SNOWFALL, STORMS, FREEZING, SYNOPTIC METEOROLOGY, PRECIPITATION METEOROLOGY, (METEOROLOGY). METEOROLOGICAL

DATA.

The daily atmospheric systems and weather fronts that traversed the northeastern United States during the SNOW-ONE-A Field Experiment from 30 November to 20 December 1981 and from 3 January to 10 February 1982 are summarized. This experiment is the second of a series of winter measurements of the influence of atmospheric obscurants on electropotical system performance. The analysis of the large-scale synoptic weather patterns that developed during the field test period constitutes a critical component of the research program. Precipitation in northern Vermont during SNOW-ONE-A was near normal for the region. Numerous separate snowfall events, including some with substantial amounts of snow, were recorded during the experiment period. Almost all of the storms that produced more than 6 cm of snow resulted from coastal cyclogenesis or developing waves that deepened as they moved north on northeastward along the Atlantic coastline. The majority of the other events with lighter amounts of freezing precipitation were caused by leas intense storm systems, troughs, or fronts that traversed the region from the west or northwest and often moved quite rapidly.

SR 83-11

EFFECT OF VESSEL SIZE ON SHORELINE AND SHORE STRUCTURE DAMAGE ALONG THE GREAT LAKES CONNECTING CHAN-

Wuebben, J.L., May 1983, 62p., ADA-134 887, 13 refs. 40-4677

SHORES, CHANNELS (WATERWAYS), ICE LOADS, SHIPS, STRUCTURES, DAMAGE, VELOCITY, GREAT LAKES.

VELOCITY, GREAT LAKES.
In conjunction with the Great Lakes connecting channels and harbors study, this report examines the potential damage to the shore and shore structures due to an increase in vessel size. The areas considered in this report are the United States shorelines along the St. Marys, St. Clair and Detroit rivers. The potential for shoreline or shore structure damage due to an increase in vessel size was reviewed on both a conceptual and site-specific basis. Ship-induced waves were ruled out as a damage mechanism since the analysis showed that the contemplated increases in vessel size would not significantly affect wave heights in the nearshore zone. Propeller wash was discounted for similar reasons. Ship-induced drawndown was determined to be the major potential damage mechanism. While larger ships potentially produce more damage, this potential is significant only in severely restricted channel sections for the size increase considered here. By far the most significant factor in ship-related damage potential is vessel speed. In almost all areas the effect of an increase in vessel size could be eliminated by a reduction in vessel speed of 1-2 mph.

SR 83-12 -A PROGRAM FOR MESOSCALE AIR-ICE-OCEAN INTERACTION EXPERIMENTS IN ARCTIC MARGINAL ICE ZONES. 2. A SCIENCE PLAN FOR A SUMMER MARGINAL ICE ZONE EXPERIMENT IN THE F.AM STRAIT/GREENLAND SEA: 1984.

Johannessen, O.M., ed, May 1983, 47p., ADA-134 872, Refs. p.19-21.
Hibler, W.D., III, ed, Wadhams, P., ed, Campbell, W.J., ed, Hasselmann, K., ed, Dyer, I., ed, Dunbar, M.,

38-876 ICE WATER INTERFACE, ICE AIR INTERFACE, ICE NAVIGATION, ICE EDGE, RESEARCH PROJECTS, GREENLAND SEA. SR 83-13

SK 83-13
REPORTS OF THE U.S.-U.S.S.R. WEDDELL
POLYNYA EXPEDITION, OCTOBER-NOVEMBER 1981, VOLUME 6: UPPER-AIR DATA.
Andreas, E.L., May 1983, 288p., ADA-134 871.

MARINE METEOROLOGY, SOUNDING, METEOROLOGICAL INSTRUMENTS, ANTARCTICA—WEDDELL SEA.

TARCTICA—WEDDELL SEA.

This report summarizes the most extensive set of upperair data ever collected over Antarctic sea ice in winter,
the data obtained using radiosondes during the U.S.-U.S.S.
Weddell Polynya Expedition. The report includes a description of the two radiosonde systems used, a chronological
ising of all 110 soundings made during the expedition,
a discussion of measured and derived quantities, listings
of all of the sounding data, and plots to 5 km of the
potential temperature profile from each sounding.

POLYNYA EXPEDITION, OCTOBER-NOVEMBER 1981 VOLUME 7: SURFACE-LEVEL METEOROLOGICAL DATA.

Andreas, E.L., et al, May 1983, 32p., ADA-134 476, 11 refs

Makshtas, A.P. 38-867

METEOROLOGICAL DATA, SEA ICE, ICE TEM-PERATURE, WIND VELOCITY, AIR TEMPERA-TURE, HUMIDITY, SOLAR RADIATION, AN-TARCTICA—WEDDELL SEA.

TARCTICA—WEDDELL SEA.

This report summarizes a comprehensive set of surface-level meteorological data collected on the Mikhail Somov over sea ice in the southern ocean during the U.S.-U.S.S.R. Weddell Polynya Expedition in October and November of 1981. The data assembled here comprise three distinct sets of measurements: the standard meteorological observations at 3-hour intervals for 41 consecutive days, radiation and ice-surface temperature measurements every hour for 23 days while the Somov was within the Antarctic ice pack, and 23 sets of atmospheric surface-layer profiles of velocity, temperature and humidity for various sea-ice conditions. (Auth.)

SR 83-15 SHORELINE EROSION AND SHORE STRUC-TURE DAMAGE ON THE ST. MARYS RIVER. Wuebben, J.L., May 1983, 36p., ADA-134 863, 4 refs. 38-886

SHORELINE MODIFICATION, SHORE ERO-SION, FAST ICE, SEDIMENT TRANSPORT, STRUCTURES, DAMAGE, ICE NAVIGATION, ICE FLOES, PIERS.

ICE FLOES, PIERS.
From 1961 to 1970 navigation on the St. Marys River closed for the winter from mid-December to mid-April. Subsequent extension of the navigation season to include the winter months resulted in complaints of shoreline and dock damage along the navigation channels. Studies were initiated to examine the potential for navigation-caused damage, but information on damage during a navigation-free winter was lacking. Since limited navigation was planned during the 1979-80 winter, the St. Marys River System could be examined under relatively undisturbed conditions. The report examines potential navigation-related damage mechanisms and presents data from the closed navigation season. The results are compared with information collected during previous periods with winter navigation.

SN 83-16 SNOW-ONE-B DATA REPORT. Bates, R.E., ed, June 1983, 284p., ADB-088 224, Refs. passim. For individual papers see 39-1952 through 39-1961. For SNOW-ONE-A—preliminary data re-port see 37-1094 (SR 82-8). Bowen, S.L., ed. 39-1951

39-1951

SNOWFLAKES, WAVE PROPAGATION, MILITARY OPERATION, SNOWFALL, SNOW-STORMS, METEOROLOGICAL DATA, VISIBILITY, ELECTROMAGNETIC PROPERTIES, OPTICAL DEPORTURES, TRANSCIONERS, METEOROLOGICAL DATA, VISIBILITY, ELECTROMAGNETIC PROPERTIES, OPTICAL DEPORTURES, TRANSCIONERS, OPTICAL DEPORTURES, TRANSCIONERS, DEPORTURES, DEPORTURES, TRANSCIONERS, DEPORTURES, DEPOR

17, ELECTROMAGNETIC PROPERTIES, OPTI-CAL PROPERTIES, TRANSMISSION.

This is the third in a series of data reports on the SNOW field experiments of the U.S. Army Corps of Engineers winter Battlefield Obscuration Research Program. It contains data obtained by the U.S. Army Cold Regions Research and Engineering Laboratory and other agencies during the SNOW-ONE-B field experiment at Camp Grayling, Michigan, between 30 November and 17 December 1982. Included are data on meteorology, atmospheric turbulence, visible and IR transmission, snow characterization, millimeter wavelength radar propagation, transmittance through falling and blowing radar propagation, transmittance through falling and blowing snow, the lidar system, the SMART system, and preliminary smoke trials with snow as a contrast background.

SR 83-17
PROCEEDINGS OF THE FIRST INTERNATIONAL WORKSHOP ON ATMOSPHERIC
ICING OF STRUCTURES, 1-3 JUNE 1982, HAN-

OVER, NEW HAMPSHIRE.
Minak, L.D., ed, June 1983, 366p., ADA-131 869,
Refs. passim. For individual papers see 38-424
through 38-463.

38-423 ICING, STRUCTURES, ICE LOADS, SNOW LOADS, ICE ACCRETION, SNOW ACCUMULA-TION, TRANSMISSION LINES, POWER LINE ICING, MEETINGS, ICE REMOVAL, ICE PRE-

EFFECT OF UNCONFINED LOADING ON THE UNFROZEN WATER CONTENT OF MANCHES-TER SILT.

Oliphant, J.L., et al, June 1983, 17p., ADA-131 851, 13 refs.

Tice, A.R., Berg, R. 39-1370

39-13/0
FROZEN GROUND STRENGTH, LOADS
(FORCES), UNFROZEN WATER CONTENT,
SOIL WATER, TEMPERATURE MEASUREMENT, NUCLEAR MAGNETIC RESONANCE, THERMODYNAMICS.

THERMODYNAMICS.

Frozen samples of a Manchester silt having various total water contents were subjected to several surcharge loads, and the unfrozen water content was measured with NMR as the temperature was gradually raised. The surcharge pressure had a greater effect on the unfrozen water content than had been predicted using the Clausius-Clapeyron equation. This effect was explained by considering the loaded samples as nonequilibrium systems in which the surcharge pressures were concentrated in the ice phase.

SR 83-19

PREDICTING LAKE ICE DECAY.

Ashton, G.D., June 1983, 4p., ADA-132 012, 4 refs.

LAKE ICE, ICE DETERIORATION, HEAT TRANSFER, FORECASTING, DEGREE DAYS, ANALYSIS (MATHEMATICS).

A nine-year record of the lake ice decay pattern of Post Pond in Lyme, New Hampshire, is analyzed using a simple algorithm. Quite good correlations between decay rates and thawing degree-days are obtained using heat transfer coefficients on the order of 15-20 W/sq m/deg C.

REPORTS OF THE U.S.-U.S.S.R. WEDDELL POLYNYA EXPEDITION, OCTOBER-NOVEM-BER 1981, VOLUME 5, SEA ICE OBSERVA-TIONS.

Ackley, S.F., et al, Jan. 1983, 6p. + 59p., ADA-130 140, 4 refs. Smith, S.J.

39-380

ICE DISTRIBUTION, POLYNYAS, ICE SEA ICE DISCONDITIONS.

CONDITIONS.

Sea ice conditions are presented in several formats. These include an ice conditions map prepared by the ship's meteorological crew, a narrative ice log supplemented by photographs taken by one of the authors, and daily satellite photographs. These are presented in a format compiling each day's conditions on one or two pages. These observations are being correlated with other satellite-based estimates of ice conditions, and with other oceanographic and meteorological measurements made during the expedition. (Auth.)

SNOW COVER AND METEOROLOGY AT AL-LAGASH, MAINE, 1977-1980. Bates, R., June 1983, 49p., ADA-132 013, 4 refs.

38-472

38-472 SNOW COVER DISTRIBUTION, SNOW SUR-VEYS, SNOW WATER EQUIVALENT, PRECIPI-TATION (METEOROLOGY), WEATHER STA-TIONS, METEOROLOGICAL DATA, UNITED

TIONS, METEOROLOGICAL DATA, UNITED STATES—MAINE—ALLAGASH.

A complete meteorological field station and a snow survey network were set up in the Allagash River Watershed to record baseline conditions prior to construction of the proposed Dickey-Lincoln Dam in the upper St. John River Basin in Allagash, Maine. Nearly three years of daily data (Oct 1977-May 1980) are summarized and compared to long-term climatic conditions for nearby National Weather Service stations. Air temperature values for Allagash are similar to those for the two nearest meteorological stations; water equivalent precipitation amounts and snowfall totals water equivalent precipitation amounts and anowall totals in the Allagash basin are inconsistent with those for nearby meteorological stations.

SR 83-21 EXAMINATION OF A BLISTERED BUILT-UP ROOF: O'NEILL BUILDING, HANSCOM AIR FORCE BASE.

Korhonen, C., et al, June 1983, 12p., ADA-133 042,

Greatorex. A

38-123

ROOFS, DEFORMATION, COLD WEATHER TESTS, MOISTURE, INFRARED SPECTROS-COPY.

COPY.

Bisters are a common defect in built-up roofs. In January 1983 we examined a recently constructed built-up roof at Hanscom Air Force Base in Bedford, Massachusetts, to determine the cause of its blisters. We used an infrared scanner, took ten core samples, conducted visual examinations, and cut open three bisters. Dur findings show that the membrane is essentially watertight and that the blisters were caused by voids that were built into the roof during construction. Poor workmanship and cold weather are the likely causes of the voids. With proper maintenance reasonable performance can be achieved from this imperfect roof.

SR 83-22 ESTIMATING TRANSIENT HEAT FLOWS AND MEASURING SURFACE TEMPERATURES OF A BUILT-UP ROOF.

Korhonen, C., July 1983, 20p., ADA-133 043, 4 refs. 38-541

HEAT TRANSFER, SURFACE TEMPERATURE, ROOFS, INFRARED EQUIPMENT, THERMAL INSULÁTION.

Transient heat flow through a multilayered building compone can be estimated using the transfer function method present in the ASHRAE (1977) Handbook of Fundamentals. So in the ASHRAE (1977) Hasobook of Fundamentals. Solitative temperature is one parameter recommended for use in this method, but surface temperatures were shown to be a reasonable substitute. Although the magnitude of the heat flow as calculated with the transfer function appears to be reasonable, more testing should be carried out to determine its accuracy. An infrared camera can measure roof surface temperatures fairly accurately; the most accurate measurements were made at night.

SP 83-23 AEROSTAT ICING PROBLEMS.

Hanamoto, B., Aug. 1983, 29p., ADA-133 403. 39-874

BALLOONS, ICING, PROTECTIVE COATINGS, ICE PREVENTION, COATINGS.

This report describes laboratory tests to determine the effectiveness of a copolymer coating on a balloon to minimize ice build-up problems when operating in sleet, freezing rain or other ice-forming conditions. Methods for descring the surface after an ice cover forms are also described. A small-scale balloon was used for the laboratory tests. A full-scale prototype was also partially coated with the copolym-er to test its effectiveness as an icing control measure

SR 83-24 CURRENT PROCEDURES FOR FORECASTING

Tucker, W.B., Aug. 1983, 31p., ADA-136 152, 23 refs. 38-2437

AIRCRAFT ICE FORECASTING. ICING. WEATHER FORECASTING, METEOROLOGI-CAL FACTORS.

The responsibilities for aircraft icing forecasts in the U.S. lie with the National Weather Service (NWS) for civilian operations and the U.S. Air Forece Air Weather Service (AWS) and Naval Weather Service for military operations. Forecasting technology is based upon empirical rules and techniques that were developed in the 1950s. The AWS is the only forecasting assency which issues explicit numerical techniques that were developed in the 1950s. The AWS is the only forecasting agency which issues explicit numerical icing products to aid the forecaster. These products are also based upon the application of techniques developed long ago. The NWS has no rigorous guidelines for developing icing forecasts, thus individual forecasters adopt their own preferred methods. The tendency is generally to "overforecast," that is, to forecast too large an area of icing for too long a time. A major shortcoming in the ability to produce more accurate forecasts is that atmospheric parameters critical to icing are not routinely observed.

SR 83-25 UNDERSTANDING THE ARCTIC SEA FLOOR

FOR ENGINEERING PURPOSES.
National Research Council. Committee on Arctic Seafloor Engineering, 1982, Washington, D.C., National Academy Press, 1982, 141p., ADA-119 773, Refs. p.115-141.
38-787

38-787
SUBSEA PERMAFROST, FROZEN GROUND PHYSICS, PERMAFROST PHYSICS, FREEZE THAW CYCLES, OCEAN BOTTOM, ICE CONDITIONS, EROSION, POLAR REGIONS, BOTTOM SEDIMENT, ENGINEERING, EXPLORATION, FROST HEAVE, PETROLEUM INDUSTRY, ICE SCORING, OFFSHORE STRUCTURES, HYDRATES, SEASONAL VARIATIONS, ARCTIC

This report identifies and assesses those arctic seafloor phenomena that influence the design and operation of facilities

and platforms for exploring and producing oil, gas, and hard minerals both on and under the sea floor. It also identifies knowledge that is needed of seafloor phenomena and conditions, and, for several areas of major concern, recommends special research. These recommendations are intended to enhance the ability of the engineer and operator to anticipate and avoid problems that may be posed by seafloor and coastal phenomena, and guard against the effects of such events as thaw subsidence and erosion.

SR 83-26
LAND TREATMENT PROCESSES WITHIN

CAPDET (COMPUTER-ASSISTED PROCE-DURE FOR THE DESIGN AND EVALUATION OF WASTEWATER TREATMENT SYSTEMS). Merry, C.J., et al, Sep. 1983, 79p., ADA-134 766, Refs. p.70-72.

Corey, M.W., Epps, J.W., Harris, R.W., Cullinane, MI Ĭr. 38-887

LAND RECLAMATION, WASTE TREATMENT, WATER TREATMENT, SEEPAGE, COMPUTER-IZED SIMULATION, ANALYSIS (MATHEMAT-

ICS).

A summary of the first-, second-, and third-order design steps for the three land treatment unit processes (slow infiltration, rapid infiltration and overland flow) within the CAPDET of the first-order design, consisting of the basic sanitary engineering processes for slow infiltration, and overland flow, is described in terms of the selected procedures and the computer format. The second-order design is a description of the quantities and sizes calculated for each land treatment process. The third-order design is the calculation of the unit process costs by applying prices to the quantities and sizes calculated during the second-order design step.

SR 83-27

REVISED PROCEDURE FOR PAVEMENT DE-SIGN UNDER SEASONAL PROST CONDI-TIONS.

Berg, R., et al, Sep. 1983, 129p., ADA-134 480, 7 refs. son, T.C. 38-888

30-808
PAVEMENTS, FROST PROTECTION, FROST ACTION, SOIL STABILIZATION, FROST HEAVE, SEASONAL FREEZE THAW, ROADS, AIRPORTS, THERMAL INSULATION, DESIGN CRITERIA.

This report presents engineering guidance and design criteria for pavements at Army and Air Force facilities in seasonal frost areas.

Design methods for controlling surface roughness and loss of subgrade strength during thawing periods are provided.

Criteria for using thermal insulating materials and membrane encapsulated soil layers in seasonal frost areas are presented. Six design examples are included.

SR 83-28

SK 5-23 SIMPLE BOOM ASSEMBLY FOR THE SHIP-BOARD DEPLOYMENT OF AIR-SEA INTERAC-TION INSTRUMENTS.

Andreas, E.L., et al, Sep. 1983, 14p., ADA-134 256, 21 refs.

Rand, J.H., Ackley, S.F.

38-868
METEOROLOGICAL INSTRUMENTS, MEATOTAL INSTRUMENTS, SHIPS, BOOMS (EQUIPMENT), ANTARCTICA.

(EQUIPMENT), ANTARCTICA.

We have developed a simple boom for use in measuring meteorological variables from a ship. The main structural member of the boom, a triangular communications tower with rollers attached along its bottom side, is deployed horizontally from a long, flat deck, such as a helicopter deck, and will support a 100-tg payload at its outboard end. The boom is easy to deploy, requires minimal ship modifications, and provides ready access to the instruments mounted on it. And because it is designed for use with the ship crosswind, oceanographic work can go on at the same time as the air-sea interaction measurements. We describe our use of the boom on the Mikhail Somov during a cruise into antarctic sea ice and present some representative measurements and ewith instruments mounted on it. Theory, experiment, and our data all imply that instruments deployed windward from a rear helicopter deck can reach air undisturbed by the ship. Such an instrument site has clear advantages over the more customary mast, bow, or buoy locations. (Auth.) (Auth.)

U.S. TUNDRA BIOME PUBLICATION LIST. Brown, J., et al, Sep. 1983, 29p., ADA-137 441. Liston, N., Murphy, D., Watts, J.

TUNDRA, VEGETATION, ECOSYSTEMS, NUTRIENT CYCLE, BIBLIOGRAPHIES, PLANT PHYSIOLOGY, SOILS, ECOLOGY, CLIMATIC PACTORS, ENVIRONMENTAL IMPACT, GROWTH.

SR 83-30

HISTORICAL BANK RECESSION AT SELECT-ED SITES ALONG CORPS OF ENGINEERS RESERVOIRS.

Gatto, L.W., et al, Sep. 1983, 103p., ADA-138 030,

Refs. p.76-79. Doe, W.W., III. 39-1371

35-1371
SOIL EROSION, RESERVOIRS, BANKS (WA-TERWAYS), ICE COVER EFFECT, FREEZE THAW CYCLES, SHORELINE MODIFICATION, ENVIRONMENTAL IMPACT, WATER WAVES, WIND FACTORS, CLIMATIC FACTORS.

This analysis was done to improve our understanding the patterns of reservoir bank recession as a preliminal step in a detailed study of reservoir bank erosion process the patterns of reservoir usua successive pin a detailed study of reservoir bank crossion processes and environmental impacts. The specific objectives were to observe and document bank characteristics, conditions and changes along reservoirs with croding banks, to estimate the amounts of historical bank recession, and to analyze its possible causes. Aerial photographs were used to observe the historical bank changes and to estimate bank recession. Site recommissance, discussions with Corps personnel, and published reports were used to evaluate possible relationships between the recession and reservoir bank conditions.

SR 83-31

PROCEEDINGS, VOL.1.

Snow Symposium, 3rd, Hanover, NH, Aug. 9-10, 1983, Oct. 1983, 241p., ADB-079 265, Refa. passim. For individual papers see 38-2119 through 38-2138.

38-2118
SNOW PHYSICS, SNOW CRYSTAL STRUCTURE, SNOW WATER EQUIVALENT, SNOW-PALL, HEAT TRANSFER, SNOW SURVEYS, MICROWAVES, REMOTE SENSING, ANALYSIS (MATHEMATICS), MEETINGS.

SR 83-32 MULTIVARIABLE REGRESSION GORITHM.

Blaisdell, G.L., et al, Nov. 1983, 41p., ADA-136 630. Carpenter, T. 38-4043

DATA PROCESSING, ANALYSIS (MATHEMATICS), COMPUTER PROGRAMS, THEORIES.

ICS), COMPUTER PROGRAMS, THEORIES.

A BASIC algorithm has been developed that is capable of fitting a user-defined regression equation to a set of data. This best-fit-curve algorithm is unique in that it allows multiple variables and multiple forms (exponential, trigonometric, logarithmic, etc.) to be present in a single regression equation. The least-equares regression performed determines the constants for each of the regression equation terms to provide a best-fit curve.

Other programs within the algorithm set allow for data entry, editing and printout, and plotting of the raw data and their best-fit regression curve.

SP 84-61

INTEGRATION OF LANDSAT LAND COVER DATA INTO THE SAGINAW RIVER BASIN GEOGRAPHIC INFORMATION SYSTEM FOR HYDROLOGIC MODELING.

McKim, H.L., et al, Feb. 1984, 19p., ADA-140 185, 16 refs.

Ungar, S.G., Merry, C.J., Gauthier, J.F. 38-4044

HYDROLOGY, REMOTE SENSING, TERRAIN IDENTIFICATION, LANDSAT, MODELS, RIVER BASINS, ENVIRONMENTAL IMPACT, FLOOD FORECAST.NG, UNITED STATES— MICHIGAN—SAGINAW RIVER.

MICHIGAN—SAGINAW RIVER.

A May 1977 Landast-2 scene that covered approximately 85% of the Saginaw River Basin was classified into five land cover categories (urban, agriculture, forest, freshwater wetlands and open water) using a closest centroid classifier. The Landast digital data were geometrically corrected to conform to a UTM (Universal Transverse Mercator) grid before classification. The 1.1-acre Landast land cover classification data base was converted to 40-acre grid cells (simb-y-six blocks of Landast pixels) using an aggregation scheme and was integrated into the Detroit District's existing grid cell data base. A regression relationship between unit hydrograph parameters and the Landast land cover classification was developed. The results indicated that the Landast land cover data were suitable for the Corps of Engineers 2 land cover data were suitable for the Corps of Engineers hydrologic model.

SR 84-02 ICE OBSERVATION PROGRAM ON THE SEMISUBMERSIBLE DRILLING VESSEL VESSEL SEDCO 708.

Minsk, L.D., Feb. 1984, 14p., ADA-139 992, 5 refs. 38-4045

SHIP ICING, ICE CONDITIONS, ICE FORMATION, ICE PREVENTION, PROTECTIVE COATINGS, OFFSHORE DRILLING, SHIPS, SEASPRAY.

A semisubmersible drilling vessel (SEDCO 708) was equipped with ice detectors and ice socretion measurement devices, and observations were conducted while it drilled an exploratory well on the North Aleutian Shelf.

One significant storm

occurred 3-8 January 1983, which resulted in light spray ice accretion, estimated at 30 tons and a maximum thickness of 5 in. on understructure diagonal trusses. Only minor icing (less than 1 in.) occurred on the windward main columns (30 ft diameter). Comparison with the 1979 Ocean Bounty icing event suggests that wind speed is the significant parameter influencing icing severity, and that light icing will occur at average speeds around 30 knots and heavy icing around 88 knots, with undefined severity within the range. Four icephobic coatings were exposed on test panels; one was effective.

SR 84-03

U.S. AIR FORCE ROOF CONDITION INDEX SURVEY: FT. GREELY, ALASKA.
Coutermarsh, B.A., Mar. 1984, 67p., ADA-142 023, 6

38-4046

ROOPS, MOISTURE DETECTION, TESTS, DE-FECTS, CRACKING (FRACTURING).

FBCIS, CRACKING (FRACTURING).

The United States Air Force Roof Condition Index Survey (RCI) procedure was studied and used on the roofs of Fort Greely, Alaska. Approximately 93 roof sections were inspected using this procedure. The results will be used in a comparison study between this method and the Army's method of infrared roof surveys and core samples. This report details the RCI method, discusses various aspects of the procedure and presents the results of the Fort Greely

SR 84-04

ASSESSMENT OF ICE ACCRETION ON OFF-SHORE STRUCTURES.

Minsk, L.D., Apr. 1984, 12p., ADA-141 996, 19 refs. 38-4047

ICE ACCRETION, OFFSHORE STRUCTURES, SEA SPRAY, SHIP ICING, OFFSHORE DRILL-ING.

ING.

The literature on sea spray (superstructure) icing is almost entirely based on observations on moving ships. However, icing on stationary offshore platforms with their fixed vertical columns will differ significantly from ship icing, which is influenced by ship movement and wind and wave directions. An observation program on offshore drilling vessels is proposed, using 1-in.-diam x 8-in.-long cylinders in arrays as a standard measuring technique for spray icing. Atmospheric icing may be a source of ice accretion on derricks in some locations, and the best commercial device currently available for measuring it is the Rosemount detector. Improved devices for both spray and atmospheric ice accretion measurements should be developed. Icephobic coatings have the potential for reducing ice accretion, and testing of candidate materials should be undertaken. Well-documented icing reports by all types of ships or platforms should be made and collected at a central clearinghouse.

SR 84-05

OPERATION OF THE U.S. COMBAT SUPPORT BOAT (USCSBMK 1) ON AN ICE-COVERED WATERWAY.

Stubstad, J., et al, Apr. 1984, 28p., ADA-142 535, 8

Rand, J.H., Jackson, L.

38-4048

38-4048
MILITARY OPERATION, ICE BREAKING,
RIVER CROSSINGS, CHANNELS (WATER-WAYS), ICE COVER EFFECT, FAST ICE, ICE
COVER THICKNESS, PONTOON BRIDGES.

From 15 January through 15 April 1982, the U.S. Combat Support Boat (USCSBMK I) was tested on the Connecticut River, in and around Hanover, New Hampshire, to examine its operation on an ice-covered waterway. The objectives were to determine to what extent shoreline ice would affect were to determine to what extent shoreline ice would affect launch and recovery and if the boat could create an ice-free channel across a river so that a ribbon bridge could be floated. Shoreline ice can inhibit launch and recovery, but several solutions were developed to reduce or eliminate these problems. The boat can, to a limited extent, be used as an expedient icebreaker. It can break competent ice sheets 3.5-4 in thick as well as significantly thicker thaw-weakened ice sheets. Sheets of well degraded "end of season" ice up to 13 in. thick were broken.

SR 84-06

MODEL TESTS IN ICE OF A CANADIAN COAST GUARD R-CLASS ICEBREAKER.
Tatinclaux, J.C., Apr. 1984, 24p., ADA-141 995, 13

refs. 38-4049

38-4049
ICEBREAKERS, ICE COVER STRENGTH, ICE
NAVIGATION, ICE FRICTION, STRENGTH,
MODELS, TESTS, ICE SOLID INTERFACE, PROPELLERS, FORECASTING, VELOCITY.
This report presents the results of resistance and propulsion
tests in level ice of a 1:20-scale model of the R-class icebreaker
of the Canadian Coast Guard. On the basis of the model
test results, full-scale performance is predicted and compared
with available full-scale trials data. Predicted ice resistance
and required propeller rpm, thrust and delivered power are
lower than full-scale measurements. This disagreement
was attributed to the fact that the ship model had a much
lower ice friction coefficient than the prototype. On the lower ice friction coefficient than the prototype. On the other hand, predictions of thrust and power for a given ship speed and propeller rpm are in good agreement with corresponding full-scale measurements.

SR 84-07

MIZEX—A PROGRAM FOR MESOSCALE AIR-ICE-OCEAN INTERACTION EXPERIMENTS IN ARCTIC MARGINAL ICE ZONES. 3. MOD-ELING THE MARGINAL ICE ZONE.

Hibler, W.D., III, ed, Apr. 1984, 99p., ADA-145 351, Discussions, p.95-98. Refs. passim. For individual papers see 39-361 through 39-374.

ICE MODELS, ICE MECHANICS, ICE EDGE, SEA ICE DISTRIBUTION, ICE WATER INTER-FACE, ICE AIR INTERFACE, WIND FACTORS, ICE CONDITIONS, OCEAN CURRENTS, RHEOLOGY.

SR 84-08
ACCUMULATION, CHARACTERIZATION,
AND STABILIZATION OF SLUDGES FOR COLD REGIONS LAGOONS.

Schneiter, R.W., et al, Apr. 1984, 40p., ADA-141 948, Refs. p.37-40. Middlebrooks, B.J., Sletten, R.S., Reed, S.C.

38-4050

SEWAGE TREATMENT, SANITARY ENGINEERING, SLUDGES, FREEZE THAW CYCLES, MODELS, POLAR REGIONS.

MODELS, POLAR REGIONS.
Accumulated solids associated with the operation of aerated and facultative lagoons in cold climates were investigated to determine 1) the rate and extent of solids accumulation. 2) the characteristics of the accumulated solids, 3) the potential for in situ stabilization of the accumulated solids, and 4) the effect of lime treatment upon the pathogenic population and subsequent solids drying on sand and soil beds. Accumulated sludges from the Logan and Corinne, Utah, facultative lagoons and the Palmer and Galena, Alasks, partial mix aerated lagoons were studied. The rates of accumulation, determined by in situ measurement of the sludge layer in each lagoon, were found to vary with lagoon type and specific operational and environmental conditions.

SR 84-09 PROCEDURE FOR CALCULATING GROUND-WATER FLOW LINES.

Daly, C.J., Apr. 1984, 42p., ADA-141 947, 4 refs.

GROUND WATER, WATER FLOW, FLUID FLOW, COMPUTER PROGRAMS, MATHEMATICAL MODELS, WATER TABLE, VELOCI-TY.

A methodology for the calculation of flow lines in steady or unsteady two-dimensional velocity fields is described. Although the principal application is intended to be determined fluid particle trajectories in groundwater flow, components of the methodology are relevant to more general problems of fluid flow. Two alternative numerical procedures form the core of the methodology. Each employs the method of characteristics to solve for the advection of fluid particles. The first uses an efficient, fourth-order Rungo-Kutta, predictorcorrector algorithm based upon a constant time step. corrector algorithm based upon a constant time step. The second use a fifth-order Runge-Kutta algorithm incorporating an embedded fourth-order result. This latter alternative includes automatic time-step modification and guarantees a prescribed level of accuracy. Several utility routines are provided in support of the method of characteristics.

SR 84-10

OBSERVATIONS DURING BRIMFROST '83. Bouzoun, J.R., et al, May 1984, 36p., ADA-142 559,

Haynes, F.D., Perham, R.E., Walker, K.E., Craig, J.L., Collins, C.M. 38-4052

38-4032 MILITARY OPERATION, COLD WEATHER OP-ERATION, ELECTRICAL GROUNDING, SHEL-TERS, WASTE DISPOSAL, SANITARY ENGI-TERS, WASTE DISPOSAL, SANITARY ENGINEERING, WATER SUPPLY, MILITARY EQUIPMENT, ICE CROSSINGS, TRAFFICABILITY.

MEN1, ICE CROSSINGS, TRAFFICABILITY.

During BRIMFROST '83, a biennial joint training exercise conducted in Alaska by the U.S. Readiness Command, a team from the U.S. Army Cold Regions Research and Engineering Laboratory made several trips into the exercise area to observe and document Army operations in the Arctic. This report presents an overview of the team's observations in the following areas: electrical grounding, camouflage, field fortifications, living shelters, water supply point operations, ice bridges, vehicular mobility and human and solid waste disposal.

SR 84-11

ANALYSIS OF INFILTRATION RESULTS AT A PROPOSED NORTH CAROLINA WASTEWA-TER TREATMENT SITE.

Abele, G., et al, May 1984, 24p., ADA-142 598, 6 refs. Bouzoun, J.R. 38-4053

WASTE TREATMENT, WATER TREATMENT, SEEPAGE, FLOW RATE, SOILS, LAND RECLAMATION, SITE SURVEYS, TESTS.

A 6-ft-diam flooding infiltration test was conducted at a proposed wastewater land treatment site near Chapel Hill, North Carolina. The saturated infiltration rate of the soil was 0.13 in./hr, and the reservation rate of the saturated

oil was equivalent to 1.35 in. of water after six days. A conservative wastewater application rate at this site would be between 1 and 2 in./wk.

DETERIORATED CONCRETE PANELS ON BUILDINGS AT SONDRESTROM, GREEN-

Korhonen, C., May 1984, 11p., ADA-142 595, 4 refs. 38-4054

CONCRETE STRUCTURES, CONCRETE STRENGTH, BUILDINGS, REINFORCED CONCRETES, DAMAGE, MOISTURE TRANSPORT, THERMAL EFFECTS, FREEZE THAW CYCLES, GREENLAND.

On July 22 1983 a dozen reinforced concrete buildings, built in 1954 at Sondrestrom Air Base in Greenland, were built in 1954 at Sondrestrom Air Base in Greenland, were examined to determine why their concrete wall panels were cracked, spalled and rust stained. The investigation determined that structural and thermal movements caused most of this deterioration. Very little freeze-thaw deterioration was evident on the outside, but the most serious problem was that of frost damage within the wall cavities fed by moisture from the inside of each building. The visible surface defects can be repaired with breathable patching materials, but to achieve long-term success and to minimize wall-cavity frost damage, vapor migration through the walls must be properly controlled.

SR 84-13

PERFORMANCE OF THE ALLEGHENY RIVER ICE CONTROL STRUCTURE, 1983.

Deck, D.S., et al, May 1984, 15p., ADA-144 094, 3 refs.

39-381

ICE CONTROL, ICE BOOMS, RIVER ICE, FRA-ZIL ICE, ICE BREAKUP, ICE JAMS, UNITED STATES—PENNSYLVANIA—ALLEGHENY

RIVER.

Oil City, Pennsylvania, is at the confluence of the Allegheny River and Oil Creek. The business district is located in the flood plain, and ice jam flooding has been a persistent problem. A floating ice control structure was installed on the Allegheny River prior to the 1983 ice season. The structure was a steel pontoon ice boom located upstream of Oil City and was used to encourage early formation of an ice cover at this location. This would suppress prolonged frazil ice generation, which in the past led to a massive freezeup jam downstream. This accumulation would prevent the discharge of ice from Oil Creek during breakup, when ice jam flooding would occur. The performance of the structure during its first year is documented here. Oil City escaped ice jam flooding during the winter of 1983. here. of 1983.

ON-SITE UTILITY SERVICES FOR REMOTE MILITARY FACILITIES IN THE COLD RE-**GIONS**

Reed, S.C., et al, May 1984, 66p., ADA-142 596, 20

Ryan, W.L., Cameron, J.J., Bouzoun, J.R. 38-4055

MILITARY FACILITIES, WASTE TREATMENT, WASTE DISPOSAL, WATER TREATMENT, WATER SUPPLY, UTILITIES, COLD WEATHER PERFORMANCE, THERMAL EFFECTS, DE-SIGN CRITERIA.

Utility services (water, sewer, solid wastes) for small, remote military facilities in cold regions require special considerations. This report presents concepts and criteria for the planning and preliminary design of internal and external utility systems. Also included are some thermal aspects for design of these water and wastewater systems.

CALCULATING BOREHOLE GEOMETRY FROM STANDARD MEASUREMENTS OF BOREHOLE INCLINOMETRY.

Jezek, K.C., et al, June 1984, 18p., ADA-145 006, 9 refs.

Alley, R.B. 39-475

BOREHOLES, ICE DRILLS, DRILLING, MEAS-UREMENT, GREENLAND.

This report is an extension of the authors' earlier registance This report is an extension of the authors' earlier resistance-tronground experiments. Here they supply additional infor-mation on the influence of salt-treated backfills around ground-ing electrodes for reducing resistance to ground. The results are based on observations made over several seasons of freezing and thawing at sites selected for their variations in grain size, ice content, and ground temperature. More than 20 test electrodes were monitored at two sit sites and one alluvial site. The diameter of the backfilled zones, the salt content, and the backfill material were varied for the electrode borehole inclinometry data collected at DYE-3, Greenland. The methods were found convenient to use and it is claimed that the results represent physically reasonable approximations to the borehole geometry.

SR 84-17 CONDUCTIVE BACKFILL FOR IMPROVING ELECTRICAL GROUNDING IN PROZEN SOILS.

Sellmann, P.V., et al, June 1984, 19p., ADA-144 861, 14 refs.

Delaney, A.J., Arcone, S.A. 39-561

39-361
FROZEN GROUND PHYSICS, ELECTRICAL
GROUNDING, ELECTRICAL RESISTIVITY,
FREEZE THAW CYCLES, PERMAFROST PHYSICS, SALINE SOILS, GRAIN SIZE, SOIL TEMPERATURE, GROUND ICE, TESTS.

PERATURE, GROUND ICE, TESTS.

This report describes two new methods for computing borehole inclination and azimuth. In the first method borehole inclination and azimuth are assumed to vary linearly with are length. This results in an analytic model of the borehole inclination and azimuth or smooth. The second model, which takes borehole inclination and azimuth to vary quadratically with arc length between three measuring points, improves the smoothness of the model but the analysis must be carried out numerically. These models were applied to the installations. In all cases salt backfilling reduced the resistance to ground, with 175 ohms being the lowest obtained. Reductions varied from very small to an order of magnitude. Resistance also decreased over several seasons. Generally the greatest improvement and lowest values were obtained in the perennially frozen silt in interior Alaska. Data from colder silt suggest that salt backfilling will not be effective in arctic settings. Measurements at a partially theyed, coarse-grained site indicate that salt was moving much more rapidly (approximately five times as fast) away from the treated backfill than at the silt site in the CRREI.

EFFECT OF SEASONAL SOIL CONDITIONS ON THE RELIABILITY OF THE M15 LAND MINE

Richmond, P.W., et al, June 1984, 35p., ADB-085 452, In English and Chinese. 2 refs. Ho, S.C., Dittemore, H.R.

FROZEN GROUND STRENGTH, SOIL STRENGTH, MILITARY ENGINEERING, EXPLOSIVES, BLASTING, METEOROLOGICAL DATA, TESTS.

Inert M15 mines with live fuzzes were tested for functioning under four soil conditions (immediately after installation in July, and in November, January and April). The mines were installed using current emplacement doctrine and initiated by driving a tank over them. Results showed significant degradation in functioning rates during winter, which was attributed to frozen soil. A change in installation doctrine

SNOW-TWO/SMOKE WEEK VI FIELD EXPERI-MENT PLAN. Redfield, R.K., et al, June 1984, 85p., ADB-089 502. Farmer, W.M., Ebersole, J.F. 39-3031

SY-3031 SNOWFALL, TRANSMISSIVITY, WAVE PROPA-GATION, SCATTERING, SMOKE GENERA-TORS, FALLING BODIES, VISIBILITY, EXPLO-SIVES, SNOW COVER EFFECT, BLOWING SNOW, TESTS, HELICOPTERS.

SR 84-20

SNOW-TWO DATA REPORT. VOLUME 2: SYS-TEM PERFORMANCE.

Jordan, R., ed, June 1984, 417p., ADB-101 241, Refs. passim. For Vol. 1 see 39-3031. For individual papers see 40-3773 through 40-3787.

SNOW PHYSICS, MILITARY OPERATION, WAVE PROPAGATION, TRANSMISSION, SMOKE GENERATORS, LIGHT SCATTERING, ELECTROMAGNETIC PROPERTIES, SNOW-FALL, BLOWING SNOW, VISIBILITY, DETECTION, COLD WEATHER PERFORMANCE.

TION, COLD WEATHER PERFORMANCE.
the SNOW-TWO/Smoke Weck VI Field Experiment held
at Camp Grayling, Michigan, was a cooperative effort of
the U.S. Army Cold Regions Research and Engineering Laboratory and the Office of the Project Manager Smoke/Obscurants,
the main objective of which was to study the effects of
mannade and natural obscurants on the performance of
electro-optical and millimeter wavelength devices. This
report presents the results obtained by CRREL and some
20 other agencies during the SNOW-TWO phase of the
experiment, covering the periods 28 November to 21 December
1983 and 4 January to 9 March 1984. It is the fourth
in a series of data reports on the SNOW field experiment
sponsored by the U.S. Army Corps of Engineers Winter
Battlefield Obscuration Research Program. The report is
in two main volumes with a supplemental classified volume.
The first volume covers the general topics of meteorology
and snow characterization; the second covers the topics of
electromagnetic wave transmission through falling and blowing
snow, target/background signatures, and system performance
in snow.

SR 84-21

RELATIONSHIPS AMONG BANK RECESSION, VEGETATION, SOILS, SEDIMENTS AND PER-MAFROST ON THE TANANA RIVER NEAR FAIRBANES, ALASKA.

Gatto, L.W., July 1984, 53p., ADA-152 332, 31 refs.

39-3030
BANKS (WATERWAYS), SOIL EROSION, PER-MAFROST DISTRIBUTION, VEGETATION, RIVER FLOW, SEDIMENTS, HYDRAULICS, UNITED STATES—ALASKA—TANANA RIVER. UNITED STATES—ALASKA—TANANA RIVEK.

The objective of this analysis was to determine if available data are useful in identifying the characteristics that contribute to evodibility of the banks along two reaches of the Tanana River. Risting data on bank vegetation, soils, sediments and permafrost were used.

Because these data were general and not collected for the purpose of sito-specific analysis, the analytical approach was simple and did not include any statistical tests. The data were visually compared to the locations and estimated amounts of historical recession to evaluate if any relationships were obvious. The results of this analysis showed no useful relationships.

SR 84-23

BUCKLING ANALYSIS OF CRACKED, FLOAT-ING ICE SHEETS.

Adley, M.D., et al, Aug. 1984, 28p., ADA-147 330. 24

Sodhi, D.S.

39-715

JY-715 ICE LOADS, FLOATING ICE, OFFSHORE STRUCTURES, ICE SHEETS, ICE PRESSURE, ICE CRACKS, ANALYSIS (MATHEMATICS), TESTS, ICE DEFORMATION.

IBSIS, ICE DEFORMATION.

A buckling analysis of cracked, floating ice sheets is presented; both symmetrical and unsymmetrical shapes were investigated. The finite element method was used for the in-plane analysis as well as the out-of-plane analysis. The results of the analyses of symmetrically shaped ice sheets are compared to those of previous analyses where a radial stress field was assumed for the in-plane stresses, and there is good agreement between them. The results of theoretical analyses are compared to analysis considerable in analysis. e compared to experimental data obtained in small-scale laboratory experime

SR 84-24

CLIMATE AT CRREL, HANOVER, NEW HAMP-SHIRE.

Bates, R.E., Aug. 1984, 78p., ADA-148 400, 6 refs.

CLIMATE, METEOROLOGICAL DATA, SNOW-FALL, PRECIPITATION (METEOROLOGY), WEATHER STATIONS, FREEZING POINTS, DEGREE DAYS, UNITED STATES—NEW HAMPSHIRE—HANOVER.

SHIRE—HANOVER.

A 10-year climatological record of meteorological data collected at the CRREL meteorological station is presented for the period October 1972 through December 1982. Data presented include air temperature, heating and freezing degreedays, relative humidity, dew point, precipitation, snowfall, wind speed and direction, solar radiation and evaporation. Air temperature and precipitation monthly and annually are compared statistically to the 30-year normal and the period-of-record normal for Hanover, New Hampshire. The appearing produced the control of record. Some comparisons are made between the 10-year averages and the long-term normals.

SALT ACTION ON CONCRETE.

Sayward, J.M., Aug. 1984, 69p., ADA-147 812, Refs. p.52-57.

39-1040
CONCRETE PAVEMENTS, SALTING, CORRO-SION, FREEZE THAW CYCLES, DAMAGE, REINFORCED CONCRETES, WEATHERING, BRIDGES, CHEMICAL ICE PREVENTION, CRACKING (FRACTURING).

CRACKING (FRACTURING).

Serious deterioration of concrete bridges by delcing salts is generally sacribed to depassivation and corrosion of reinforcing steel, as growth of its corrosion products causes spalling, there, simple evaporative tests simulated the salt weathering that slowly crumbles rocks in nature, where crystals growing from pore water fed from below stress the matrix just as do ice crystals in frost heaving soil. Like needle ice (surface frost action in soil) the salt columns exuded from concrete also lifted tiny particles, signifying crumbling. Microcracks developed in 1-3 years of after-test dry storage.

SR 84-26

SECONDARY STRESS WITHIN THE STRUC-TURAL FRAME OF DYE-3: 1978-1983. Ueda, H.T., et al, Sep. 1984, 44p., ADA-148 401, 5

Tobiasson, W., Fisk, D., Keller, D., Korhonen, C.

39-1138
SNOW LOADS, STRESSES, MILITARY FACILITIES, STRUCTURES, FOUNDATIONS, LOADS (FORCES), WIND FACTORS, COLD WEATHER CONSTRUCTION, GREENLAND.

**TOTAL Line and station DYE-1 was moved sideways 210

DEW line ice cap station DYE-3 was moved sideways 210 ft and placed on a new foundation in 1977, then raised

27 ft in 1978. Secondary forces within the structure steel framework were measured in 1978, 1981, 1982 an 1983. The overall level of secondary stresses had increase but through 1983 the columns were still within their stre but through 1983 the columns were still within their stress limitations. Some localized overstress is expected in 1984. The concept of using above-surface trusses to resist wind loads and brace the eight columns has proven to be satisfactory. It has eliminated the subsurface enclosures used in the past to protect subsurface trusses, enclosures that proved to be the structural weak link of the original facility; their elimination has resulted in a stronger facility that is easier to maintain. The measurements and findings of this program were used in the development of the design to extend the life of DYE-3 to be implemented in 1984. That work should reduce the level of secondary stresses in the frame.

DEUTERIUM DIFFUSION IN A SOIL-WATER-ICE MIXTURE.

Oliphant, J.L., et al, Sep. 1984, 11p., ADA-148 457, 7

Tice, A.1 39-1139

PROZEN GROUND PHYSICS, ISOTOPES, SOIL WATER MIGRATION, PHASE TRANSFORMA-TIONS, TESTS, LABORATORY TECHNIQUES.

An experiment was performed to determine the rate of equilibration of deuterium between the ice and liquid phases of water in partially frozen soil. The results of this experiment are consistent with a diffusion rate of deuterium ice of 1 or 2 ten-billionths sq cm/s. A method for calculating the approximate equilibration time, given the size of the ice crystals in the system, is provided. This calculation compares well with the experimental results.

SR 84-28

-A PROGRAM FOR MESOSCALE AIR-ICE-OCEAN INTERACTION EXPERIMENTS IN ARCTIC MARGINAL ICE ZONES. 4: INI-TIAL RESULTS AND ANALYSIS FROM MIZEX 83. Sep. 1984, 56p., ADA-148 255, Refs. passim. For individual papers see 39-1124 through 39-1130. 39-1123

ICE MECHANICS. DRIFT STATIONS. EDGE, SEA ICE DISTRIBUTION, RHEOLOGY, ICE CREEP, OCEANOGRAPHY, ICE WATER IN-TERFACE, ICE AIR INTERFACE, ICE CONDI-

TIONS

SR 84-29 SK 84-29
MIZEX: A PROGRAM FOR MESOSCALE AIRICE-OCEAN INTERACTION EXPERIMENTS
IN ARCTIC MARGINAL ICE ZONES. 5:
MIZEX 84 SUMMER EXPERIMENT PI PRELIMINARY REPORTS.

Johannessen, O.M., ed, Oct. 1984, 176p., ADA-148 986, Refs. passim. For selected papers see 40-4691 through 40-4703.

Horn, D.A., ed.

40-4690 ICE PHYSICS, DRIFT STATIONS, ICE EDGE, SEA ICE, REMOTE SENSING, OCEANOGRA-PHY, ACOUSTIC MEASUREMENT, MARINE BI-OLOGY, ICE FLOES.

SR 84-30

CONVENTIONAL LAND MINES IN WINTER: EMPLACEMENT IN FROZEN SOIL, USE OF TRIP WIRES AND EFFECT OF FREEZING RAIN.

Richmond, P.W., Nov. 1984, 23p., ADB-091 027, 9

refs. 40-3580

MILITARY ENGINEERING, AUGERS, FROZEN GROUND, SNOW COVER, MINES (ORD-NANCE), RAIN, FREEZING, SEASONAL VARIATIONS.

This report presents information relating to land mine use in winter. Three areas are addressed: the emplacement of mines in frozen soil, the use of trip wires in snow, and the effect of freezing rain on antitank mines. Data from a minefield installation exercise provide information on the installation of a 100-m minefield under summer and winter conditions.

SR 84-31

COMPARISON OF THREE COMPACTORS USED IN POTHOLE REPAIR. Snelling, M.A., et al, Nov. 1984, 14p., ADA-149 937,

Raton R A

39-2099

ROAD MAINTENANCE, BITUMINOUS CON-CRETES, COMPACTION, EQUIPMENT, DENSI-TY (MASS/VOLUME), TEMPERATURE EF-FECTS.

This report is a summary of the results of a compaction study using recycled hot mix asphalt concrete conducted during August 1983 in an indoor facility at CRREL in Hanover, New Hampshire. This study compared three kinds of compactors for optimum performance, and also considered such factors as temperature of the asphalt concrete

mix, number of passes, size and depth of patches, and the number of lifts to fill the holes. Results showed that a vibratory roller and vibratory plate compactor could both compact patches to the desired 98% of laboratory density, but that a 200-lb lawn roller could not. Temperature of the hot recycled mix is critical, with 250F being the cut-off temperature. It was shown that if the mix is not compacted promptly after placement and is allowed to cool below 250F, proper compaction may not be attained.

SE \$4-32 FROZEN PRECIPITATION AND CONCUR-RENT WEATHER: A CASE STUDY FOR MUN-CHEN/RIEM, WEST GERMANY. CHEN/RIEM, WEST GERMANY. CHEN/RIEM, WEST GERMANY. CHEN/RIEM, WEST GERMANY.

Bilello, M.A., Nov. 1984, 47p., ADA-149 227, 29 refs.

WEATHER FORECASTING, SNOWFALL, METEOROLOGICAL DATA, MILITARY OPER-ATION, PRECIPITATION (METEOROLOGY), VISIBILITY, FREEZING, RAIN, WINTER, CLI-MATE, GERMANY—MUNICH.

This study evaluates statistical data for two or more meteorological parameters, recorded concurrently, to improve prediction of atmospheric conditions that would obscure a winter battle-field. The analysis considers only freezing precipitation types that were categorized and correlated with simultaneously observed weather conditions, such as temperature, humidity and visibility, using 11 years of winter weather records for Munchen/Riem, Federal Republic of Germany. These results are an example of the unusual and essential environmental information that can be derived from available records. It is suggested that similar investigations should be conducted for other sites in central Europe. This study evaluates statistical data for two

SR 84-33 ¿PROCEEDINGS₃. Workshop on Ice Penetration Technology, Hanover, 1012 1024 Dec 1984, 345n., ADB-093 NH, June 12-13, 1984, Dec. 1984, 345p., ADB-093 880, Refs. passim. Discussions, p.319-336. For individual papers see 40-1962 through 40-1965. 40-1961

PENETRATION TESTS, ICE COVER STRENGTH, ICE BREAKING, MILITARY OPERATION, ICE DRILLS, ICE COVER THICKNESS, MEETINGS, SEA ICE, SUBMARINES.

ICE DRILLING TECHNOLOGY.

ICE DRILLING TECHNOLOGY.

Holdsworth, G., ed, Dec. 1984, 142p., ADA-156 733,
Refs. passim. For individual papers see 40-1176
through 40-1199 or F-32743 through F-32750.
Kuivinen, K.C., ed, Rand, J.H., ed, International
Workshop/Symposium on Ice Drilling Technology,
2nd, Calgary, Alberta, Aug. 30-31, 1982.
40-1175

ICE CORING DRILLS, ICE CORES, BOREHOLE INSTRUMENTS, ICE DRILLS, MEETINGS, DRILLING FLUIDS, TEMPERATURE EFFECTS.

The Symposium on Ice Drilling Technology dealt with research on the operation and design of ice coring drills. Various types of drills, as well as drilling fluids, used in the Arctic and Antarctic are described. The boreholes and ice cores are used to study ice physics and climatic changes.

SR 84-35
PROCEEDINGS, VOL.1.
Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984, Dec. 1984, 433p., ADB-090 935, Refs. passim.
For individual papers see 39-2945 through 39-2981. 39-2944

39-2944
ST. WILITARY OPERATION, SNOWFLAKES, SCATTERING, SMOKE ABROSOLS, MEETINGS, REFLECTIVITY, REMOTE SENSING, SPECTRA

PERMAFROST, SEASONALLY FROZEN GROUND, SNOW COVER AND VEGETATION IN THE USSR.

Bigl, S.I p.26-31. 40-1052 S.R., Dec. 1984, 128p., ADA-153 628, Refs.

PERMAFROST DISTRIBUTION, ACTIVE LAY-ER, SNOW COVER, VEGETATION, PERMA-FROST THERMAL PROPERTIES, PERMA-FROST DEPTH, GROUND ICE, SEASONAL VARIATIONS, USSR.

A survey of the Cold Regions Science and Technology Bibli-raphy and other references in the CRREL library was condua survey of the Cold Regions Science and Technology Bibliography and other references in the CRREL library was conducted to compile recent information about several Soviet physiogeographic features: permañous, seasonally frozen ground, snow cover and vegetation. The products of the study are 1) a series of maps presenting the general distribution of these features over the entire Soviet Union and 2) a collection of 57 maps showing the local distribution of ground ice and permafrost.

SR 84-37 OVERVIEW OF TANANA RIVER MONITOR-ING AND RESEARCH STUDIES NEAR FAIR-

Neill, C.R., et al, Jan. 1984, 98p. + 5 appends., ADA-167 790, Refs. passim. For individual articles see 38-4207 through 38-4211.

Buska, J.S., Chacho, E.F., Collins, C.M., Gatto, L.W. 38-4206

BANKS (WATERWAYS), RIVER FLOW, SOIL EROSION, SEDIMENT TRANSPORT, FLOOD CONTROL, EMBANKMENTS, ENVIRONMEN-TAL IMPACT, AERIAL SURVEYS, PERMA-FROST, COUNTERMEASURES, UNITED STATES—ALASKA—TANANA RIVER.

STATES—ALASKA—TANANA RIVER.

The Tanana River changes character in the vicinity of Fairbanks, from the braided pattern upstream of North Pole to the anastomosing or irregular meander pattern downstream of the Chena River confluence. This transition in planform is accompanied by a marked decrease in gradient and a change in dominant bed material from gravel to sand. Within the past 50 years the river has been affected by a variety of human activities, including flood control works, access causeways and gravel entractions. The Phase III in river levee and groin construction constituted a strong local disturbance of the river system where local river slope was steepened and large quantities of bed material were put into transport from pilot channel enlargement as the river adjusted to the new alignment. As of the end of 1982, the full and final effects of this disturbance were not clear. Recommendations are given regarding impacts from human activities, alleviation of impacts, levee protection, further interpretive analysis and future monitoring of river behavior.

CATALOG OF CORPS OF ENGINEERS STRUC-TURE INVENTORIES SUITABLE FOR THE ACID PRECIPITATION-STRUCTURE MATERI-AL STUDY.

Merry, C.J., et al, Mar. 1985, 40p., ADA-154 364, 4

McKim, H.L., Humiston, N.H.

PRECIPITATION (METEOROLOGY), CHEMICAL PROPERTIES, CONSTRUCTION MATERIALS, ENVIRONMENTAL PROTECTION, DAM-AGE, BUILDINGS, COST ANALYSIS, COMPUT-ER APPLICATIONS.

ER APPLICATIONS.

This report contains a survey of Corps of Engineers floodplain inventories. Its purpose was to determine if enough building materials information was available in the Corps data base to be used for predicting the distribution of building materials across the country as part of the EPA acid rain assessment program. The floodplain surveys were rated using the criteria of the date of the surveys, the number of buildings, the variety of building materials, the amount of dimensions data listed for the buildings, the land cover types in the data, and whether or not the data were computerized. Six structure inventories are recommended for further study. SR 85-02

SURVEY OF ICE PROBLEM AREAS IN NAVI-GABLE WATERWAYS.
Zufelt, J., et al, Apr. 1985, 32p., ADA-157 477.
Calkins, D.J.

40-3360 ICE NAVIGATION, ICING, LOCKS (WATER-WAYS), DAMS, ICE CONTROL, RIVER ICE, ICE CONDITIONS, ICE JAMS, ICE BREAKUP.

CONDITIONS, ICE JAMS, ICE BREAKUP.

This report presents the findings of a survey of ice problems encountered on the nation's major navigable waterways. A survey questionnaire was developed and, through a field review group, was distributed to lock and dam facilities on the Allegheny, Monongahela, Ohio, Kanawha, Kaaksakia, and Mississippi Rivers and the Illinois Waterway. Analysis of the completed questionnaires identified 13 ice problem categories. The report describes each category of ice problem encountered, as well as the cited methods, operational and/or structural, undertaken to reduce the impact of each ice problem. ice problem. SIR 85-03

PERIGLACIAL LANDFORMS AND PROCESSES IN THE SOUTHERN KENAI MOUNTAINS, ALASKA.

Bailey, P.K., Apr. 1985, 60p., ADA-157 459, Refs. p.54-60.

PERIGLACIAL PROCESSES, LANDFORMS, PERMAFROST DISTRIBUTION, GEOMOR-PHOLOGY, PATTERNED GROUND, NUNATAKS, ALTIPLANATION, NIVATION, SOIL TEMPERATURE, UNITED STATES—ALASKA— KENAI MOUNTAINS.

The distribution and characteristics of periglacial landforms in the southern Kenai Mountaina, Alaska, were investigated during 1979 and 1980. The principal area of study was a 1300-m-high mountain mass that stood as a numatak during the last general glaciation. Periglacial features in the area include gelifuction lobes, nivation hollows, cryoplanation terraces, tors, a string bog, and such patterned ground as sorted circles, sorted obygons, earth hummocks, sorted steps, sorted stripes, and small ice-wedge polygons.

SR 85-04

USER'S GUIDE FOR THE BIBSORT PROGRAM FOR THE IBM-PC PERSONAL COMPUTER Kyriakakis, T., et al, Ar . 1985, 61p., ADA-157 936. 39-4055

MANUALS, COMPUTER PROGRAMS, COM-PUTER APPLICATIONS. DATA PROCESSING, BIBLIOGRAPHIES.

PUTER APPLICATIONS.

This report is intended to provide the reader with stepby-step instructions on how to use the BIBSORT computer
program on the IBM Personal Computer. The program
allows storage and retrieval of bibliographic data. The
program has been tested on an IBM-XT, using DOS 1.1
or 2.1. The program requires a monitor and a printer.
This user's guide discusses how to prepare diskettes to enter
the data, how to name categories and files, how to open
categories and files, and how to obtain a hard copy fo the
sorted data. Bach data diskette can take up to 500 entries,
samming 512 characters per entry. A section on how
to change the program to fit specific needs is presented
in Appendix A, and the program listing is in Appendix

WORKSHOP ON PERMAFROST GEOPHY-SICS, GOLDEN, COLORADO, 23-24 OCTOBER

Brown, J., ed, May 1985, 113p., ADA-157 485, Refs. passim. For individual papers see 40-1290 through 10-1308.

Metz, M.C., ed, Hoekstra, P., ed. 40-1289

PERMAPROST PHYSICS, GEOPHYSICAL SUR-VEYS, PERMAPROST DISTRIBUTION, SUBSEA PERMAPROST, BOREHOLES, WELL LOGGING, MEETINGS, PERMAPROST THERMAL PROP-ERTIES, OIL WELLS.

MIZEX—A PROGRAM FOR MESOSCALE AIR-ICE-OCEAN INTERACTION EXPERIMENTS IN ARCTIC MARGINAL ICE ZONES. 6: MIZEX-WEST.

Wadhams, P., ed, May 1985, 119p., ADA-167 310, Refs. passim. For individual papers see 40-4167 Refs. passim. F through 40-4180. 40-4166

SEA ICE DISTRIBUTION, ICE AIR INTERFACE, ICE WATER INTERFACE, ICE MECHANICS, REMOTE SENSING, ICE CONDITIONS, ICE EDGE, ICE FLOES, WIND FACTORS, WATER TEMPÉRATURE.

ANALYSIS OF THE REVERE, QUINCY AND STAMFORD STRUCTURE DATA BASES FOR PREDICTING BUILDING MATERIAL DISTRI-BUTTON

Merry, C.J., et al. May 1985, 35p., ADA-157 458, 8

LaPotin, P.J. **40-**1010

CONSTRUCTION MATERIALS, PRECIPITA-TION (METEOROLOGY), CHEMICAL PROPER-TIES, BUILDINGS, RAIN, FORECASTING.

TIES, BUILDINGS, RAIN, FORECASTING. Data bases on buildings in Revere and Quincy, Masschusetts, and Stamford, Connecticut, were studied to determine if a measure of building material distribution could be calculated for a city using land use, census tract and the Corpa' data on buildings. Statistical measures of chi-square, asymmetric lambda, uncertainty coefficient, F ordinate, as well as the correlation coefficient-squared and eta-swared statistics were calculated for the three data bases. The Corps definition of building type was found to be the best predictor of the building surface area. However, all indicators (including building type) explained only low percentages of the variability in the dependent variable (building surface area). These results indicate that other variables are required to explain the variability of building surface area adequately.

SR 85-08 STEFAN'S PROBLEM IN A FINITE DOMAIN WITH CONSTANT BOUNDARY AND INITIAL CONDITIONS: ANALYSIS.

Takagi, S., June 1985, 28p., ADA-158 558, 13 refs.

FROST HEAVE, BOUNDARY LAYER, STEFAN PROBLEM, ANALYSIS (MATHEMATICS).

PROBLEM, ANALYSIS (MAINEMATICS). Stefan's problem in a finite domain is solved under constant boundary and initial conditions. Starting in a semi-infinite domain, the solution passes infinitely many stages of lead times in a finite domain and finally becomes stationary. The singularity at the finite terminal necessitates introduction of lead times. Including lead times, parameters defining the solution vary with time. Only the analytical result is reported in this paper.

SR 25.00

U.S. PERMAFROST DELEGATION VISIT TO THE PEOPLE'S REPUBLIC OF CHINA, 15-31 JULY 1984.

Brown, J., June 1985, 137p., ADA-158 535, 19 refs. 40-1051

PERMAFROST BENEATH STRUCTURES, PER-MAFROST THERMAL PROPERTIES, PERMA-FROST DISTRIBUTION, FROZEN GROUND MECHANICS, ORGANIZATIONS, ENGINEER-ING, FREEZE THAW CYCLES, DAMAGE, GEO-CRYOLOGY, CHINA.

CRYOLOGY, CHINA.

A U.S. delegation of 15 scientists and engineers representing federal and state agencies, industry, and universities specializing in problems of seasonally and perennially frozen ground visited China during the period 15-31 July, 1984. The trip was organized by the Ministry of Railways and was co-hosted by the Academia Sinica's Institute of Glaciology and Cryopedology in Lanzhou. The 16-day visit was in return for a U.S.-hosted visit of a Chinese delegation to Alaska and the West Coast in July 1983 as part of the Fourth International Conference on Permafrost. The U.S. Committee on Permafrost of the National Research Council organized the U.S. participation. The facilities visited are described and technical information obtained is discussed.

PREVENTION OF FREEZING AND OTHER COLD WEATHER PROBLEMS AT WASTEWA-TER TREATMENT FACILITIES.

Reed, S.C., et al, July 1985, 49p., ADA-160 727, 23

Pottle, D.S., Moeller, W.B., Ott. R., Peirent, R., Niedringhaus, E.L. 40-1476

40-14/6
UNDERGROUND FACILITIES, FREEZING,
COLD WEATHER PERFORMANCE, WASTE
TREATMENT, WATER TREATMENT, FROST
PROTECTION, COUNTERMEASURES, DE-SIGN.

SIGN.

Freezing and other cold weather problems are a major cause of poor performance at wastewater treatment plants in cold climates. This report, based on experience in Alaska, in the north central U.S. and on a survey of over 200 treatment systems in northern New England, presents procedures and criteria so that designers can avoid cold weather problems in future systems. It also contains detailed guidance for assisting operators in overcoming current problems and deficiencies. The information is organized and presented in terms of the major process units that are likely to be found in a typical wastewater treatment system. A number of detailed case studies of problems and solutions at specific systems in northern New England are also included.

SK 85-12 SUITABILITY OF POLYVINYL CHLORIDE PIPE FOR MONITORING TNT, RDX, HMX AND DNT IN GROUNDWATER. Parker, L.V., et al, Aug. 1985, 27p., ADA-160 733, Refs. p. 19-22.

Jenkins, T.F., Foley, B.T. 40-1497

PIPES (TUBES), GROUND WATER, WATER POLLUTION, WATER CHEMISTRY, MATERIALS, TESTS, SALINITY.

ALS, TESTS, SALINITY.

A number of samples of commerical PVC groundwater monitoring pipe, which varied in schedule, diameter or manufacturer, were placed in contact with low concentrations of aqueous solutions of TNT. RDX, HMX and 2,4-DNT for 80 days under nonsterile conditions. Results indicated that there was some loss of TNT and HMX in the presence of PVC pipe compared to glass controls but that for the most part concentrations of analyte were equivalent between types of pipe.

A second experiment was performed to determine if the losses were due solely to sorption or if biodegradation was also a factor. This experiment was done under a variety of groundwater conditions by varying salinity, initial pH and dissolved oxygen. The only case where there was increased loss of any substance because of the presence of PVC pipe was in the TNT solution under nonsterile conditions. This increased loss was thought to be associated with increased microbial degradation rather than sorption. Therefore, given the length of time of this experiment and the small amount of loss attributable to sorption, PVC groundwater monitoring pipe is acceptable for monitoring groundwater for these munitions. Several samples of PVC pipe were also leached with groundwater for 80 days and no detectable interferences were found by reversed phase HPLC analysis.

CONSTRUCTION AND CALIBRATION OF THE OTTAUQUECHEE RIVER MODEL.
Gooch, G., Aug. 1985, 10p., ADA-159 902.

ICE JAMS, ICE BREAKUP, RIVER ICE, ICE FOR-MATION, MODELS, FLOODING, WATER SUP-PLY, TESTS.

The Ottauquechee River is located in west-central Vermont This river was chosen for a physical hydraulic model using This river was chosen for a physical hydraulic model using real ice. The model was built at a scale of 1:50 horizontal and 1:20 vertical.

After problems with modeling bed roughness and operating the pump system were overcome, the tests went smoothly. SR 85-15

PROCEEDINGS OF THE ISTVS WORKSHOP ON MEASUREMENT AND EVALUATION OF TIRE PERFORMANCE UNDER WINTER CON-DITIONS, ALTA, UTAH, 11-14, APRIL 1983.

DITIONS, ALTA, UTAH, 11-14, APRIL 1983. ISTVS Workshop on Measurement and Evaluation of Tire Performance under Winter Conditions, Alta, Utah, Apr. 11-14, 1983, Sep. 1985, 177p., ADA-161 129, Refs. passim. For individual papers see 40-3321 through 40-3335. Blaisdell, G.L., ed, Yong, R.N., ed. 40-3320

TIRES, COLD WEATHER PERFORMANCE, MOTOR VEHICLES, ROAD ICING, MILITARY EQUIPMENT, SNOW COVER EFFECT, TRAC-TIÒN, MEBTINGS.

SR 85-16
SAMPLE DIGESTION AND DRYING TECHNIQUES FOR OPTIMAL RECOVERY OF MERCURY FROM SOLD AND SEDIMENTS. Cragin, J.H., et al, Sep. 1985, 16p., ADA-161 948, 9

Foley, B.T. 40-4456

SOIL CHEMISTRY, SEDIMENTS, METALS, DE-TECTION, CHEMICAL ANALYSIS, DRYING.

Mercury in soils and sediments can be accurately determined over the concentration range of 0.04 to 2 microgram Hg/g using amalgamation on thin gold films. Relative standard deviation of analysis is about 10%. A mild sample dissolution technique, involving HNO3 at 75C, produced quantitative Hg recoveries for certified sediment samples and recoveries equivalent to those of rigorous Parr-bomb digestions for other soil and sediment samples. Oven drying of samples at 150C resulted in significant losses of Hg from both soil and sediment samples. Air drying, oven drying at 60C or freeze drying resulted in Hg recoveries that agreed within 20% of those for undried samples. Thus, any one of these three comparable methods is recommended for Hg determinations in soils and sediments. Mercury in soils and sediments can be accurately determ

SR 85-18 SNOW IN THE CONSTRUCTION OF ICE BRIDGES.

Coutermarsh, B.A., et al, Oct. 1985, 12p., ADA-163 118, 6 refs. Phetteplace, G.

40-3269

40-3209 ICE CROSSINGS, MILITARY OPERATION, SNOW (CONSTRUCTION MATERIAL), SNOW COVER EFFECT, SURFACE PROPERTIES, ICE SURFACE, ICE COVER STRENGTH.

SURFACE, ICE COVER STRENGTH.

Snow's contribution as a wearing surface, leveling material or reinforcement to ice bridges is discussed. It is shown that it has limited value as a reinforcement and then only ys adding water and freezing the resulting slurry. Snow can be used effectively as either a leveling or wearing surface but natural ice thickening is inhibited by the insulating property of the snow. The snow should be of uniform depth and not mounded or windrowed to avoid deflecting the ice away from the water surface. This would substantially weaken the carrying capacity of the ice bridge.

SR 85-19

DESCRIPTION OF THE BUILDING MATERI-ALS DATA BASE FOR NEW HAVEN, CONNECT-

Merry, C.J., et al, Nov. 1985, 129p., ADA-166 457, 13

LaPotin, P.J.

40-3270
CONSTRUCTION MATERIALS, CHEMICAL
PROPERTIES, SAMPLING, DAMAGE, STATISTICAL ANALYSIS, COMPUTER APPLICATIONS, PRECIPITATION (METEOROLOGY),
ENVIRONMENTAL PROTECTION.

ENVIRONMENTAL PROTECTION.

A building material sampling program for the New Haven, connecticut, region was conducted in March and April of 1984 to examine the types and amounts of building surface materials exposed to acid deposition.

A stratified, systematic, unaligned random sampling approach was used to generate sample points across the five sampling frame are:

At least 107 sample points were examined per sampling frame to yield a total sample size of 576 points.

Building sizes, surface materials, roof characteristics, roof-mounted apparatus, chimneys, gutters, downspouts, fences and miscellaneous outdoor accessories were recorded.

This report provides an initial summary of the data collected. Sample sizes indicate that additional sampling is required to produce the desired 70 sites (with buildings) per frame.

SR 85.20

POTENTIAL OF REMOTE SENSING IN THE CORPS OF ENGINEERS DREDGING PRO-GRAM.

McKim, H.L., et al, Nov. 1985, 42p., ADA-166 334, Refs. p.23-37.

Klemas, V., Gatto, L.W., Merry, C.J. 40-3271

DREDGING, REMOTE SENSING, AERIAL SUR-VEYS, CHANNELS (WATERWAYS), SEDIMENT TRANSPORT, SUSPENDED SEDIMENTS, ENVI-RONMENTAL IMPACT.

RONMENTAL IMPACT.

The potential of remote sensing in the Corps of Engineers Dredging Program for providing data on channel surveys, sediment drift and dispersion during dredging, water quality and suspended sediment concentrations, and selection of disposal sites and monitoring environmental effects at disposal sites was reviewed. The recommended remote sensor combination for recording dredging and environmental changes was a small, single-engine surveraft equipped with at least two 70-mm or 33-mm cameras. The first camera should be loaded with color film and the second camera with color infrared film for vesetation or land use manning, or passing the color of the color o infrared film for vegetation or land use mapping, or pan-chromatic film with special filters for water studies. For bathymetric mapping, the cameras will have to be supplemented by airborne impulse radar or laser profilers, and possibly sonar depth finders. A combination of small aircraft and boats is optimum for mapping currents and observing plume dynamics.

COMPARISON OF EXTRACTION TECH-NIQUES AND SOLVENTS FOR EXPLOSIVE RESIDUES IN SOIL.

Jenkins, T.F., et al, Nov. 1985, 33p., ADA-166 474, 11

Leggett, D.C. 40-3272

SOIL CHEMISTRY, EXPLOSIVES, SOIL POLLU-TION, ULTRASONIC TESTS, CHEMICAL ANAL-

Extraction of TNT, TNB, RDX and HMX from two soils was studied in terms of process kinetics and recovery. Two solvents, acctenitrile and methanol, and four extraction techniques, Soxhlet, ultrasonic bath, mechanical shaker and homogenizer-sonicator were compared. The results were complex in that some interactions among analyte, method and solvent were found. Acctonitrile was found to be clearly superior to methanol for RDX and HMX. Soxhlet and ultrasonic bath generally recovered more than homogenizers of shake and ultrasonic bath generally recovered more than homogenizers. clearly superior to methanol for RDX and HMX. Southlet and ultrasonic bath generally recovered more than homogenizer or shaker, although a complicating factor is that all techniques were not necessarily at equilibrium. In terms of sample throughput, the ultrasonic bath and ahaker are preferred over Southlet and homogenizer-sonicator. The ultrasonic bath generally approached equilibrium more rapidly than the shaker so it appears to be the best overall choice. Another complicating factor is that times to reach equilibrium were different for the two soils and for the different analytes. This points to the need for more kinetic studies on othe soils and sediments.

PRELIMINARY INVESTIGATIONS OF MINE DETECTION IN COLD REGIONS USING SHORT-PULSE RADAR.

Arcone, S.A., Nov. 1985, 16p., ADB-100 401, 10 refs. 40-3302

DETECTION, SNOW COVER EFFECT, RADAR ECHOES, MINES (ORDNANCE), DIELECTRIC PROPERTIES, FROZEN GROUND PHYSICS, PO-LARIZATION (WAVES), POLAR REGIONS.

EARLEATION (WAVES), FOLKER RECOUNTS.
Short-pulse roder is being investigated as a tool for detecting mines in cold regions. The specific problem is the detection of mines buried in a snowpack characterized by a dielectric constant. In this preliminary investigation air and frozen sand are used to roughly approximate the dielectric extremes of a dry snowpack. The radar signal used had a duration of 3-4 ns and a broad frequency spectrum centered near 800 MHz. The responses of mines suspended in air were first recorded as a function of polarization and orientation. Mine responses were then recorded for emplacement in a fairly homogeneous dielectric of frozen sand. The waveform amplitudes depended strongly on mine orientation and weakly on polarization. Resonance in air at all orientations and polarizations for a particular mine type were similar. F sponses in the sand were easily recognizable for an anten standoff of I m, but depended on target size. Investigation a snowpack are now beginning.

REGRESSION MODELS FOR PREDICTING BUILDING MATERIAL DISTRIBUTION IN FOUR NORTHEASTERN CITIES.

Merry, C.J., et al, Dec. 1985, 50p., ADA-166 335, 12 refs.

LaPotin, P.J. 40-3303

QUILDINGS, POLAR REGIONS, MODELS, DISTRIBUTION.

The Corps of Engineers conducted a field sampling program for inventorying building materials in the northeastern United States, and the data from the field program were compiled into a data base for statistical analysis.

Correlation coeffi-

cients were derived between the independent variables and the surface area of the five building material types. The correlation coefficients were used in an optimal stepries regression model developed for each material class for each city. A number of factors appear to be significantly associated with the distribution of building material exposure. How-ever, the variables do not correlate at levels required for constructing adequate predictive models that would be applica-ble to other sampling locations.

SR 85-25

BLASTING AND BLAST EFFECTS IN COLD REGIONS. PART 1: AIR BLAST.
Mellor, M., Dec. 1985, 62p., ADA-166 315, 23 refs.
40-3304

BLASTING, EXPLOSION EFFECTS, SHOCK WAVES, ATTENUATION, ANALYSIS (MATHEMATICS), POLAR REGIONS.

Air blast phenomena are reviewed and a digest of data is given, mainly in graphical form. To the extent possible, corresponding data are given for air blast in cold regions, provided that the prevailing conditions are significantly differ-ent from those of temperate regions.

USACRREL PRECISE THERMISTOR METER. Trachier, G.M., et al, Dec. 1985, 34p., ADA-166 470, 4 refs.

Morse, J.S., Daly, S.F. 40-3305

FRAZIL ICE, WATER TEMPERATURE, THER-MISTORS, ICE FORMATION, MEASURING INSTRUMENTS, ACCURACY.

STRUMENTS, ACCURACY.

To facilitate the study of frazil ice in the field, a highly accurate, portable water temperature meter was required. The USACRREL Precise Thermistor Meter was designed and built to meet this need. The meter is rugged, battery-operated, waterproof, and able to operate over a wide range of ambient temperatures. A unique feature of this instrument is the use of software to compensate for temperature-dependent variation in the analog electronics. The circuitry consists of an analog printed circuit board and a low power microcomputer. The resistance of a calibrated thermistor is determined and its temperature calculated using the Steinhart-Hart equation. The accuracy of the meter was determined both theoretically and in cold room tests. The hardware and software used in the meter are described.

SK 86-01
TECHNOLOGY TRANSFER OPPORTUNITIES
FOR THE CONSTRUCTION ENGINEERING
COMMUNITY: MATERIALS AND DIAGNOSTICS. 1986, 54p., ADA-166 360, Refs. passim. For
selected papers see 40-4705 through 40-4708. 40-4704

40-4704
DETECTION, CONSTRUCTION MATERIALS,
ROOPS, PAVEMENTS, MAINTENANCE, PROTECTIVE COATINGS, THERMAL CONDUCTIVITY, CONCRETE AGGREGATES.

NITROGEN REMOVAL IN COLD REGIONS TRICKLING FILTER SYSTEMS.

Reed, S.C., et al, Feb. 1986, 39p., ADA-167 118, 19 refs.

Diener, C.J., Weyrick, P.B.

WASTE TREATMENT, WATER TREATMENT, SEEPAGE, CHEMICAL ANALYSIS, TEMPERATURE EFFECTS, DESIGN, HEAT LOSS, POLAR REGIONS.

REGIONS.

Trickling filters are found in about 50% of the operating wastewater treatment systems owned by the U.S. Army, and more are likely for any new construction. Control of nitrogen, particularly ammonia in wastewater effluents, is a growing necessity. Ammonia can be removed in trickling filters but the process is temperature-dependent. This study combined an intensive literature review with data collection at full-scale and pilot-scale systems. These results are presented and evaluated. A liquid temperature of at least 7 C is necessary in the filter bed for effective ammonia removal, and a separate single-purpose filter bed dedicated for nitrification is recommended when significant ammonia removal is required at cold regions locations. Criteria and equations are derived for future cold region system designs. designs.

COMPARISON OF WINTER CLIMATIC DATA FOR THREE NEW HAMPSHIRE SITES, Govoni, J.W., et al, Mar. 1986, 78p., ADA-167 427,

5 refs. Smith, S.J.

40-3582

40-3582
ICE DETECTION, ICING, METEOROLOGICAL
DATA, CLIMATE, DEW POINT, WIND VELOCITY, WIND DIRECTION, PRECIPITATION
(METEOROLOGY), ALTITUDE, HUMIDITY,
UNITED STATES—NEW HAMPSHIRE.

This data report contains climatological measurements for the winters of 1980-81 and 1981-82 made at three sites in New Hampshire situated at elevations of 155 m, 870 m and 1910 m above sea level. Parameters measured

included wind speed and direction, precipitation, temperature, humidity, and duration of icing events. Comparison of the data provides the opportunity to examine the influence of elevation on atmospheric icing occurrence and intensity. In New Hampshire, icing appears to occur only at elevations above about 500 m.

SR 86-08

DESCRIPTION OF THE BUILDING MATERIALS DATA BASE FOR PITTSBURGH, PENN-

Merry, C.J., et al, Apr. 1986, 87p., ADA-167 285, 15 refa.

LaPotin, P.J.

40-3583 40-3583
CONSTRUCTION MATERIALS, PRECIPITATION (METEOROLOGY), BUILDINGS, ENVIRONMENTAL PROTECTION, ROOFS, CHEMICAL ANALYSIS, STATISTICAL ANALYSIS,
COST ANALYSIS, UNITED STATES—PENNSYLVANIA—PITTSBURGH.

SYLVANIA—PITTSBURGH.

A building materials sampling program for the Pittsburgh, Pennsylvania, region was conducted in December 1984 through February 1985 to examine the types and amounts of building surface materials exposed to acid deposition. A stratified, systematic, unaligned random sampling approach was used to generate sample points across six sampling frame areas. A minimum of 70 sample points was examined per sampling sizes, surface materials, roof characteristics, roof-mounted apparatus, chimneys, gutters, downspouts and fences were recorded. This report provides an initial summary of the data collected.

MONOGRAPHS

THERMAL PROPERTIES OF SOILS.

Farouki, O.T., Dec. 1981, 136p., ADA-111 734, Refs. p.125-132. 39-1258

FROZEN GROUND THERMODYNAMICS, PER-MAFROST HEAT TRANSFER, FROZEN GROUND MECHANICS, SOIL PHYSICS, SOIL MECHANICS, THERMAL CONDUCTIVITY, SOIL WATER, SOIL FREEZING.

SOIL WATER, SOIL FREEZING.

This monograph describes the thermal properties of soils, unfrozen or frozen. The effects on these properties of water and its phase changes are detailed. An explanation is given of the interaction between moisture and heat transfer. Other influences on soil thermal properties are described, including such factors as soil composition, structure, additives, saits, organics, hysteresis and temperature. Techniques for testing soil thermal conductivity are outlined and the methods for calculating this property are described. The monograph gives the results of an evaluation of these methods whereher their predictions were command with measured monograph gives the results of an evaluation of these methods whereby their predictions were compared with measured values, thus showing their applicability to various soil types and conditions.

M 81-02

FROST SUSCEPTIBILITY OF SOIL; REVIEW

Chamberlain, E.J., Dec. 1981, 110p., ADA-111 752, For another source see 37-973 (MP 1557). Refs. 39-2034

39-2034
FROST HEAVE, SOIL FREEZING, SOIL ME-CHANICS, ICE WATER INTERFACE, ICE SOLID INTERFACE, SOIL CLASSIFICATION, TEM-PERATURE GRADIENTS, SOIL WATER, PARTI-CLE SIZE DISTRIBUTION, GRAIN SIZE.

CLE SIZE DISTRIBUTION, GRAIN SIZE.

Methods of determining the frost susceptibility of soils are identified and presented in this report. More than one hundred criteria were found, the most common based on particle size characteristics. These particle size criteria are frequently augmented by information such as grain size distribution, uniformity coefficients and Atterberg limits. Information on permeability, mineralogy and soil classification has also been used. More complex methods requiring pore size distribution, moisture-tension, hydraulic-conductivity, heave-streas, and frost-heave tests have also been proposed. However, none has proven to be the universal test for determining the frost susceptibility of soils. Based on this survey, four methods are proposed for further study. They are the U.S. Army Corps of Engineers Frost Susceptibility Classification System, the moisture-tension hydraulic-conductivity test, a new frost-heave test, and the CBR-after-thaw test.

M 82-01 GROWTH, STRUCTURE, AND PROPERTIES

OF SEA ICE. Weeks, W.F., et al, Nov. 1982, 130p., ADA-123 762, Refs. p.117-130.

Ackley, S.F. 37-2407

SEA ICE, ICE ELECTRICAL PROPERTIES, ICE MECHANICS, ICE SALINITY, ICE THERMAL PROPERTIES, ICE CRYSTAL STRUCTURE, ICE PHYSICS, GRAIN SIZE, ICE CRYSTAL GROWTH, GAS INCLUSIONS, TEMPERATURE

EFFEC1S. This monograph describes in some detail the current state of knowledge of the observed variations in the structural characteristics (grain size, crystal orientation, brine layer spacing) and composition (brine, gas and soild salts) of sea ice as well as the presumed causes of these variations. The importance of these variations in controlling the large observed changes in the mechanical, thermal and electrical properties of the sea ice is also discussed.

MECHANICAL BEHAVIOR OF SEA ICE Mellor, M., June 1983, 105p., ADA-131 852, Refs. p.99-105. 38-469

35-407 SEA ICE, ICE MECHANICS, ICE ELASTICITY, ICE STRENGTH, FRACTURING, FLEXURAL STRENGTH, STRESSES, STRAINS, RHEOLOGY, MECHANICAL PROPERTIES, PRESSURE RIDGES, ANALYSIS (MATHEMATICS).

RIDGES, ANALYSIS (MATHEMATICS).

The first part of the report provides an introduction to the mechanics of deformable solids, covering the basic ideas of stress and strain, rheology, equilibrium equations, strain/displacement relations, constitutive equations, and failure criteria.

Practure mechanics and fracture toughness are also reviewed to the second part of the report summarizes available data on the mechanical properties of freshwater ice and saline ice, accounting for the influences of strain rate and

loading rate, temperature, porosity, salinity, and grain size. Boundary value problems are not dealt with, but there is discussion of some miscellaneous topics, including thermal strains, behavior of brash ice, and pressure ridges. The report was written as a study text for a NATO Advanced report was written as a study text for a NATO Advanced Study Institute on Sea/Ice/Air Interactions, and was intended to be used in conjunction with companion texts on related

FRAZIL ICE DYNAMICS.

Daly, S.F., Apr. 1984, 46p., ADA-142 037, Refa. p.44-

PRAZIL ICE, ICE MECHANICS, ICE CRYSTAL GROWTH, ICE CRYSTAL NUCLEI, HEAT TRANSFER, ICE FORMATION, ICE PREVENTION, SUPERCOOLING, TURBULENT FLOW, ANALYSIS (MATHEMATICS).

ANALYSIS (MATHEMATICS).

To describe the dynamic evolution of frazil ice in turbulent natural water bodies, the basic equation for dynamic frazil crystal number continuity and the basic equation of heat balance for a differential volume are developed. Crystal growth and nucleation of new crystals are the major parameters in these equations. Expressions for the growth rate of frazil ice crystals are the major parameters in these equations. Expressions for the growth rate along the major axis is controlled by heat transfer. The heat transfer coefficient is a function of crystal size, the fluid urbulence, and the fluid properties. The magnitude of inertial and buoyancy forces on the ice crystals are determined as is their influence on the heat transfer. Spontaneous nucleation of ice can be discounted; accondary nucleation is responsible for the vast majority of frazil ice crystals. The theoretical rate of secondary nucleation is partially modeled as a function of the supercooling, fluid turbulence and crystal size distribution. A simple analytical solution of the basic equations is developed for the growth of frazil ice in a well-mixed, steady-state crystallizer.

M 84-02 ATMOSPHERIC ICING ON SEA STRUCTURES. Makkonen, L., Apr. 1984, 92p., ADA-144 448, Refs. p.77-92. 39-97

39-97
ICING, OFFSHORE STRUCTURES, ICE ACCRETION, ICE PREVENTION, ICE ADHESION, ICE SOILD INTERFACE, ICE PHYSICS, CLIMATIC FACTORS, ICE LOADS, SUPERCOOLING, ANALYSIS (MATHEMATICS), DESIGN.

ANALYSIS (MATHEMATICS), DESIGN.

Atmospheric icing (icing due to fog, precipitation and water vapor in air) as a physical process and the problems it causes for ships and stationary offshore structures are reviewed. Estimation of the probability and severity of atmospheric icing based on climatological and geographical factors is discussed, and theoretical methods for calculating the intensity of atmospheric icing at sea are suggested. Existing data on the dependence of the atmospheric icing rate and the properties of the accreted ice on the meteorological conditions are analyzed. The methods of measuring the icing rate and ice prevention methods are discussed.

DELL SEA

M 84-03 ICE DYNAMICS. Hibler, W.D., III, July 1984, 52p., ADA-147 376, Refs. p.48-52.

39-896 39-896
ICE MECHANICS, RHEOLOGY, DRIFT, THERMODYNAMICS, ICE PLASTICITY, OCEANOGRAPHY, SEA ICE, ICE FORMATION, ICE AIR
INTERFACE, ICE WATER INTERFACE, ICE
STRENGTH, ICE COVER THICKNESS, ICE
MODELS, SEA WATER, ANTARCTICA—WEDDELI SELA

DELL SEA.

This monograph reviews essential aspects of sea ice dynamics of the Arctic and Antarctic on the geophysical scale and discusses the role of ice dynamics in air-sea-ice interaction. The review is divided into the following components: a) a discussion of the momentum balance describing ice drift, b) an examination of the nature of sea ice rheology on the geophysical scale, c) an analysis of the relationship between ice strength and ice thickness characteristics, and d) a discussion of the role of ice dynamics in the atmosphere-ice-ocean system. Because of the unique, highly nonlinear nature of sea-ice interaction, special attention is given to the ramifications of ice interaction on sea ice motion and deformation. These ramifications are illustrated both by analytic solution and by numerical model results. In addition, the role of ice dynamics in the atmosphere-ice-ocean system is discussed in light of numerical modeling experiments, including a fully coupled ice-ocean model of the Arctic-Oreenland-Norwegian seas.

M \$5-01 EROSION OF NORTHERN RESERVOIR SHORES. AN ANALYSIS AND APPLICATION OF PERTINENT LITERATURE Lawson, D.E., May 1985, 198p., ADA-157 811, Refs. p.137-191.

40-4448
SHORE EROSION, ICE COVER EFFECT, RESERVOIRS, SLOPE PROCESSES, PERMAFROST, SHORELINE MODIFICATION, GROUND WATER, WATER LEVEL, MODELS, WATER WAVES, FORECASTING, TEMPERATURE EF FECTS.

FECTS. This monograph describes the current state of knowledge of northern reservoir shore erosion, primarily by examining the results of erosional studies on lakes, coasts and rivers. The major erosional processes of reservoir beaches and bluffs and their mechanics are discussed in detail. Thermal and physical parameters affecting the erodibility of shores, the environmental impacts of erosion, and the basic characteristics of the unique reservoir environment are reviewed. Current models of shore zone development are also presented. This literature analysis revealed that knowledge of erosion and recession in northern impoundments is severely limited. Quantitative analyses of the processes of erosion and their relative importance, parameters determining the nature, rate and timing of erosion, and models to predict the erodibility of a shore for use in minimizing shoreline recession remain in need of basic field research.

TECHNICAL DIGESTS

USING ELECTRONIC MEASUREMEN EQUIPMENT IN WINTER. Atkins, R.T., July 1981, 7p., ADA-148 795, 5 refs. 39-2092 TD 81-01 MEASUREMENT 39-2092
ELECTRONIC EQUIPMENT, COLD WEATHER
PERFORMANCE, MEASURING INSTRUMENTS, SEMICONDUCTORS (MATERIALS),
THERMAL INSULATION, CABLES (ROPES),
WINTER, TEMPERATURE EFFECTS. TD 82-01 PREEZING AND BLOCKING OF WATER PIPES Carey, K.L., May 1982, 11p., ADA-148 943, 10 refs. 39-2093
PIPELINE FREEZING, WATER FLOW, ICE FORMATION, WATER PIPES, TEMPERATURE EFFECTS, COUNTERMEASURES, DESIGN, ICE CONTROL, WATER PRESSURE, FREEZEUP. TD 83-01 MELTING ICE WITH AIR BUBBLERS. Carey, K.L., Mar. 1983, 11p., ADA-148 739, 7 refs. 39-2094 39-2094
ICE MELTING, BUBBLING, FLOATING ICE, ICE BREAKING, ICE CONTROL, PORTS, PIERS, DOCKS, ANALYSIS (MATHEMATICS). TD 83-02 ICE-BLOCKED DRAINAGE: PROBLEMS AND PROCESSES.
Carey, K.L., Nov. 1983, 9p., ADA-148 738, 2 refs.
39-2095
PIPBLINE FREEZING, DRAINAGE, CULVERTS, ICE FORMATION, FREEZEUP, ICE REMOVAL, DESIGN, COUNTERMEASURES, HEAT TRANSFER, WINTER MAINTENANCE. TD 84-01 ENGINEER'S POTHOLE REPAIR GUIDE. Eaton, R.A., et al, Mar. 1984, 12p., ADA-148 736, 3 refs. Wright, E.A., Mongeon, W.E. 39-2096
ROAD MAINTENANCE. WINTER MAINTENANCE, DAMAGE, ENGINEERING, PAVEMENTS. TD 84-02 SOLVING PROBLEMS OF ICE-BLOCKED DRAINAGE. Carey, K.L., Sep. 1984, 9p., ADA-148 737, 4 refs. 39-2097 DRAINAGE, ICE FORMATION, PIPELINE FREEZING, CULVERTS, ICE REMOVAL, ICE CONTROL, ENGINEERING, COUNTERMEASURES, FREEZEUP. TD 86-01 INTRODUCTION TO HEAT TRACING. Henry, K., June 1986, 20p., Refs. p.18-20.
40-4447
HEATING, HEAT TRANSFER, PIPELINE PREEZING, SHIP ICING, FREEZING, COUNTERMEASURES, PROTECTION.

MISCELLANEOUS PUBLICATIONS

MP 843 ON THE USE OF TENSIOMETERS IN SNOW

HYDROLOGY.
Colbeck, S.C., Journal of glaciology, 1976, 17(75), p.135-140, 11 refs.
30-3540

SNOW HYDROLOGY, MEASURING INSTRU-MENTS, WATER PRESSURE.

MENTS, WATER PRESSURE.

The construction and use of snow-water tensiometers is described. Water pressure at the base of a shallow, Arctic snow-pack was measured to illustrate the response of the basal layer to water percolation. Water tension above an ice layer and water flux through the ice layer were measured in glacial now. The gravity flow theory is used to explain the close agreement between these parameters. This suggests that the ice layer has little effect on the flow field and that gravity (rather than tension gradients) controls the flow. Further work on water tensions is needed to identify the role of tension gradients in ripening and shallow snow covers. (Auth.)

MP 844

SNOW AND ICE.

SNOW AND ICE. Colbeck, S.C., et al, Reviews of geophysics and space physics, July 1975, 13(3), p.435-441, 475-487, Refs. p.475-487. Thorndike, A.S., Willans, I.M., Hodge, S.M., Ackley,

S.F., Ashton, G.D. 30-2083

ICE SHEETS, ICE SHELVES, SNOW SURVEYS, SEA ICE, GLACIOLOGY, ICE PHYSICS, RE-SEARCH PROJECTS.

THIRD INTERNATIONAL SYMPOSIUM ON ICE PROBLEMS.

Frankenstein, G.E., ed, International Association of Hydraulic Research, 1975, 627p., For individual papers see 30-2708 through 30-2759.

ICE NAVIGATION, RIVER ICE, ICE JAMS, SEA ICE, ICE LOADS, HYDRAULIC STRUCTURES, MERTINGS.

MP 846
RESURVEY OF THE "BYRD" STATION, ANTARCTICA, DRILL HOLE.
Garfield, D.E., et al, Journal of glaciology, 1976, 17(75), p.29-34, 4 refs.
Ueda, H.T.

30-3529

BOREHOLE INSTRUMENTS, ICE SHEETS, FLOW MEASUREMENT, MECHANICAL PROP-ERTIES, ANTARCTICA—BYRD STATION.

The drill hole at "Byrd" station, which was completed in Jan. 1968 to a vertical depth of 7063 ft (2153 m) below the top of the hole casing, was resurveyed in Jan. 1975 to a vertical depth of 4835 ft (1474 m). Inclination and azimuth measurements were made with a Parsons multiple to a vertical depth of 4835 ft (1474 m). Inclination and arimuth measurements were made with a Parsons multiple shot inclinometer and compared with the earlier measurements made during drilling. The results indicate a progressively increasing displacement with depth to a value of 51.2 ft (15.6 m) or about 7.3 ft/year (2.23 m/year) at the 4835 ft (1474 m) level. The direction of movement relative to the surface varies from acuth-west at 300 ft (91.5 m) to north-east at 1100 ft (335 m) to cast at 3368 ft (1027 m) to north-east at 4835 ft (1474 m), indicative of a complex twisting motion. An increase in accessible depth slong the hole axis of 18 ft (5.49 m) beyond the 1969 depth was noted. No attempt was made to measure the hole diameter or vertical strain. It is recommended that the hole be resurveyed in 3-5 years if it is still logistically feasible, using a more up-dated inclinometer. (Auth.) MP 847

GAS INCLUSIONS IN THE ANTARCTIC ICE SHEET AND THEIR GLACIOLOGICAL SIGNIFICANCE.

Gow, A.J., et al, Journal of geophysical research, Dec. 20, 1975, 80(36), p.5101-5108, 16 refs. Williamson, T.

30-2295

ICE SHEETS, DRILL CORE ANALYSIS, GAS IN-CLUSIONS, BUBBLES, AIR ENTRAINMENT, ICE PRESSURE, ANTARCTICA—BYRD STA-TION.

Cores obtained to the bottom of the Antarctic Ice Sheet at Byrd Station have been used to analyze some physical properties of the air bubbles trapped in the ice. These bubbles constitute the remnant air that is retained when polar snow transforms into glacial ice. Parameters measured include size, shape, abundance, and spatial distribution of bubbles, gas volumes, and bubble pressures and their variations with depth in the ice sheet. Bubbles occur abundantly

in the top 800 m of ice but then gradually disappear until they can no longer be detected optically below 1100 m. This disappearance is not accompanied by any significant loss of air from the ice, and the available evidence suggests that the air is retained in the form of a gas hydrate or clathrate. Because of the release of confining pressures following drilling, the hydrate begins to decompose soon after cores are pulled to the surface. This decomposition is accompanied by the growth of gas-filled bubblelike cavities that are easily distinguishable from original sir bubbles. Bubble pressure measurements show that (1) bubbles with pressures exceeding about 16 bars begin to relax back to this value soon after in situ pressures are relieved by drilling. (2) further slow decompression will occur with time, and (3) the rate of decompression is controlled to some extent by the intrinsic structural properties of the ice and its thermal and deformational history. Only small variations were observed in the entrapped air content of the ice cores; they probably reflect variations in the temperature and/or pressure of the air at the time of its entrapment. Only in ice from the bottom 4.83 m was the air content observed of air coincided precisely with the first appearance of straiffed moraine in the correct it is concluded that this ice originated in ice from the outcom 4.53 in was the air content concrete to decrease to trace amounts. Since this virtual absence of air coincided precisely with the first appearance of stratified moraine in the cores, it is concluded that this ice originated from the refreezing of air-depleted water produced under pressure melting conditions at the bottom of the ice aheet.

HEIGHT VARIATION ALONG SEA ICE PRES-SURE RIDGES AND THE PROBABILITY OF FINDING "HOLES" FOR VEHICLE CROSS-INGS.

Hibler, W.D., III, et al, Journal of terramechanics, Dec. 1975, 12(3/4), p.191-199, 5 refs. For this paper from another source see 28-3039.

from another source and ackley, S.F.
30-3387
SEA ICE, PRESSURE RIDGES, AIR CUSHION VEHICLES, ICE CROSSINGS, HEIGHT FIND-

sure ridges are major obstacles to vehicle mobility See ice pressure ridges are major obstacles to vehicle mobility in the Arctic Basin. An estimate of the expectation of holes of various heights and widths in the ridges is desirable for optimum vehicle design. This study uses probability theory and ridge shadow measurements from aerial photographs of sea ice to determine the distribution of holes of various heights and widths in pressure ridges. General conclusions are drawn regarding trafficability of this terrain for vehicles of various sizes.

MP 849 MEASUREMENT OF SEA ICE DRIFT FAR FROM SHORE USING LANDSAT AND AERIAL PHOTOGRAPHIC IMAGERY.

International Symposium on Ice Problems, 3rd, Hanover, New Hampshire, 18-21 August 1975. Proceedings, International Association of Hydraulic Research, 1975, p.541-554, 6 refs. Tucker, W.B., Weeks, W.F. 30-2755

SEA ICE, ABRIAL SURVEYS, PHOTOGRAMME-TRY, ICE DEFORMATION, DRIFT, LANDSAT.

TRY, ICE DEFORMATION, DRIFT, LANDSAT. This paper discusses recent work on the development of analysis procedures for obtaining drift and deformation measured from sequential visual imagery of sea ice that is located far from land. In particular for LANDSAT images far from land a semi automatic procedure for transferring the location coordinates of a common set of ice features from the Earth coordinate system of one image to another is discussed. Necessary inputs for the transfer are the location coordinates and latitude and longitude) of the center of each image and latitude and longitude) of the center of each image and the location of two arbitrary points on a known line of longitude; all this information is available from LAND-SAT, although with some error. These errors will produce remerious answerous amerent strains if velocities are estimated by simply SAT, although with some error. These errors will produce spurious apparent strains if velocities are estimated by simply taking position differences. With regard to measuring strain from sea ice aerial imagery without ground control, errors in such measurements are examined using uncorrected photographs. The errors in using such uncorrected imagery and using common undeformed ice floes to establish a common scale are found to be of the order of 1% whereas typical maximum differential motions are as large as 5%.

MIF 850
STATISTICAL VARIATIONS IN ARCTIC SEA
ICE RIDGING AND DEFORMATION RATES.
Hibler, W.D., III, Ice Tech Symposium, Montreal,
Canada, April 9-11, 1975. Proceedings, New York,
Society of Naval Architects and Marine Engineers,
1975, p.JI-J16, 13 refs. Includes discussions.
30-1846

SEA ICE, PACK ICE, ICE DEFORMATION, ICE PRESSURE, OFFSHORE STRUCTURES, ICE CONDITIONS, STRESSES, ICE NAVIGATION, STATISTICAL DATA.

Past studies of statistics of pressure ridges have supplied useful information on the nature of pressure ridge height and spacing distributions as well as information on accompanical and temporal variations in ridging. These statistics should be of some aid in the construction of Arctic offshore structures and in icobreaking and shipping operations. By coupling these height and spacing statistics with information on ridge lengths, the amount of detouring necessary to avoid ridges may be estimated. Closely associated with ridging are drift and deformation studies. Two aspects of these studies applicable to this conference are (1) the prediction of the rate of opening and closing of the pack ice, and (2) estimation of typical geophysical stresses in the ice pack. Theoretical and experimental work at CRREL indicates that certain approximate rules may be invoked to estimate the divergence rate far from coastal boundaries, namely that in winter the pack ice should diverge in reasonably well localized high pressure systems, whereas in summer the ice typically diverges in low pressure systems. As regards estimates of geophysical stresses, estimates from a variety of sources suggest that maximum stresses integrated through the pack ice thickness are of the order of 10,000 to 100,000 N/m. The upper limit is approximately equal to the force required to crush 0.25-meter-thick as a ice.

CONTINUOUS MONITORING OF TOTAL DIS-

SOLVED GASES, A PEASIBILITY STUDY.
Jenkins, T.F., Gas Bubble Disease Conf-741033, Battelle, Pacific Northwest Laboratories, Richland, Washington, Oct. 8-9, 1974, Proceedings, 1975, p.101-105,

31-1900 BUBBLES, WATER, GAS INCLUSIONS, SURVIV-AL, EXPERIMENTATION, MONITORS.

Ap preliminary investigation was undertaken to determine if a continuous analyzer could be configured to monitor dissolved gases in natural waters. A three-component system was designed consisting of a pumping system, a continuous stripper, and a detector. Prototypes of the first two components were assembled and evaluated under field conditions. Based upon these results, it is possible to configure an unattended near-continuous monitor to measure total dissolved eased. ed, near-continuous monitor to measure total dissolved gas concentration in natural waters.

ISLANDS OF GROUNDED ICE.

Kovacs, A., et al, Arctic, Sep. 1975, 28(3), p.213-216, 10 refe

McKim, H.L., Merry, C.J.

SEA ICE, GROUNDED ICE, BRTS IMAGERY. The report demonstrates the usefulness of BRTS-1 imagery for locating and identifying islands of grounded ice. Several

MP 853

IDENTIFICATION OF NUCLEI AND CONCEN-TRATIONS OF CHEMICAL SPECIES IN SNOW CRYSTALS SAMPLED AT THE SOUTH POLE. Kumai, M., Journal of the atmospheric sciences, May 33(5), p.833-841, 16 refs. 30-3647

SNOW COMPOSITION, CLAY MINERALS, SNOW CRYSTAL NUCLBI, ANTARCTICA— SOUTH POLE.

SOUTH POLE.

A total of 380 electron micrographs and electron diffraction patterns of 93 mow crystal nuclei were analyzed in this observation. The nuclei were identified as mainly clay minerals and sodium chloride particles. The clay mineral nuclei were lilite 20%, knotine 3%, halloysite 4%, vermicuite 3%, and related minerals 24%. For the other nuclei, sodium chloride accounted for 5%. Fifteen percent of the snow crystals did not appear to have nuclei. Therefore, all nuclei found in anow crystals were terrestrial substances from oceans and continents. The shapes of snow crystals were single bullets, combinations of bullets, and hexagonal hollow columns. The snow crystals formed at temperatures from 30 to -35C. The snow crystals formed at temperatures from 50 to 100 mm. The mean mass concentration of sodium chloride in snow crystals was 40.6 ppb and that of clay minerals was 15.4 ppb. The sodium chloride nucleus concentration coincided within the experimental error with data taken from the chemical analysis of the South Pole snow cover made by several workers. It was concluded that most of the sodium chloride contained in the South Pole snow cover was due to the sodium chloride nuclei of snow crystals.

OPTICAL PROPERTIES OF SALT ICE

Lane, J.W., Journal of glaciology, 1975, 15(73), Symposium on Remote Sensing in Glaciology, Cambridge, 16-20 September, 1974, p.363-372, 12 refs., In English with French and German summaries. Includes 30-2349

SALT ICE, ICE OPTICS, LIGHT SCATTERING. SALT ICE, ICE OPTICS, LIGHT SCATTERING. The dependence of the extinction coefficient on salinity was investigated for both NaCl-ice and sali-tice made from natural sea-water. Specimens were prepared under a variety of conditions and examined over the wavelength range 4,000 to 8,000 A. The effects of scattering from air bubbles trapped in the ice were examined for ice made from distilled water. It was found that the method of preparing samples markedly affected their structure, but that, when prepared in the same manner, salt-ice made from natural sea-water and NaCl-ice did not show significantly different transmission properties. It was found that, for a wavelength of 6328 A, the data could be fit to the relation ker_1i.67-0.85 exp (-0.27x)/cm within an uncertainty of 26%, where ke is the extinction coefficient, and x is the salinity of the ice in g/kg. Within an uncertainty of 10%, there was no variation in transmission for ice at the same temperature and salinity over the wavelength range 4000 to 8000 A. salinity over the wavelength range 4000 to 8000 A measurements were made at a temperature of -200C.

MP 855 MECHANISMS OF CRACK GROWTH IN

MECHANIOWAN QUARTZ. Martin, R.J., III, et al, Journal of geophysical research, Dec. 10, 1975, 80(35), p.4837-4844, 21 refs. Durham, W.B.

Jurnam, w.B.

30-3068

ROCKS, CRACK PROPAGATION, WATER
TRANSPORT, QUARTZ.

A previous study of time-dependent crack growth in singlecrystal quartz has been expanded to examine the possibility
of microfracturing events during stable crack growth, to
look for evidence of plastic deformation associated with
crack propagation, and to determine the dependence of crack
growth on crystallographic orientation. No discernible effect
of orientation on the temperature or change in applied streas
or partial pressure of water dependencies during sequential
crack growth episodes was observed, and no correlation
was found between observed microfracturing events and the
rate of crack propagation. However, the magnitude of
the applied stress to achieve the desired rates of crack
extension did vary with orientation. No evidence of plastic
deformation has been found in samples of quartz undergoing
time-dependent crack growth at temperatures up to 250C.
Some Dauphine twins have been observed at temperatures
above 125C. The fact that the stress, temperature, and water
dependencies are independent of orientation is interpreted to
suggest that the observed time-dependent cracking is controlled
by the transport of water to the crack tip.

MP 856

GENERAL CONSIDERATIONS FOR DRILL SYSTEM DESIGN.

Mellor, M., et al, Ice core drilling, edited by J.F. Splettstoesser, Lincoln, University of Nebraska Press, 1976, p.77-111, 58 refs.

Sellmann, P.V. 30-3483

Sellmann, P.V. 30-3483
ICE CORING DRILLS, DRILLING, ROTARY DRILLING, THERMAL DRILLS.
Drilling systems are discussed in general terms, component functions common to all systems are identified, and a simple classification is drawn up in order to outline relations between penetration, material removal, hole wall support, and ground conditions. Energy and power requirements for penetration of ice and frozen ground are analyzed for both mechanical and thermal processes. An electromechanical coring drill has been used for deep drilling in Greenland and Antarctica. Thermal drills have also been used for boring holes in ice although they are not as efficient, in energetic terms, as mechanical drills. Power requirements for removal of material and for hoisting of drill strings are considered, and total power requirements for complete systems are assessed. Performance data for drilling systems working in ice and frozen ground are reviewed, and results are analyzed to obtain specific energy values. Specific energy data are assembled for drag-bit cutting, normal impact and identation, liquid jet attack, and thermal penetration. Torque and axial for capabilities of typical rotary drilling systems are reviewed and analyzed. The overall intent is to provide data and quantitive guidance that can lead to systematic design procedures for drilling systems for cold regions. (Auth. mod.) design proced (Auth. mod.)

COMPUTER SIMULATION OF THE SNOW-MELT AND SOIL THERMAL REGIME AT BAR-ROW, ALASKA.

Outcalt, S.I., et al, Water resources research, Oct. 1975, 11(5), p.709-715, 17 refs. For another version

of this paper see 29-4001. Goodwin, C., Weller, G., Brown, J.

COMPUTERIZED SIMULATION, SNOW TEM-PERATURE, SOIL TEMPERATURE, THERMAL DIFFUSION, SNOW FENCES, WATER SUPPLY.

An annual anow-soil simulator for arctic tundra was developed by using coupled models of surface equilibrium temperature and substrate thermal diffusion. Soow ripening, melt, and accumulation are modeled in the simulator which is forced with daily weather data. The simulator predicts that a now fence array capable of producing drift deeper than 4.2 m will initiate a permanent snowfield at Barrow. Alsaka. Such a man-induced snowfield could serve as a reliable source of freshwater for Barrow and similar villages in the north slope region of Alsaka. Further analysis indicated that albedo reduction due to dust fall, snow removal, etc., is dominant over aerodynamic effects in producing the early spring meltout observed at Barrow Village.

MP 858 FORCES ON AN ICE BOOM IN THE BEAU-HARNOIS CANAL.

HARNOIS CANAL-Perham, R.E., et al, International Symposium on Ice Problems, 3rd, Hanover, New Hampshire, 18-21 Au-gust 1975. Proceedings, International Association of Hydraulic Research, 1975, p.397-407, 7 refs.

Racicot, L. 30-2743

ICE BOOMS, SHEAR STRESS, ICE PRESSURE, LOADS (FORCES).

LOADS (FORCES).

Ice booms are used to hasten the formation of a stable ice cover in early winter. Their main function is to reduce the area of open water where large amounts of ice floes and frazile ice can be generated. This ice, if uncontrolled, can cause an ice jam or blockage at power house intakes and restrict its generating capacity. A particular function of the forebay ice boom of the Beauharnois Power House is to prevent any ice upstream from moving down into the forebay. In the winter of 1974-75 CRREL obtained force measurements of both cross stream and downstream components in the forebay ice boom. The purpose of this paper is to report these forces and their variations. A limited amount of supplemental data such as water flow, ice thickness, and canal dimensions is provided. All of the information should help in the understanding of interaction between an ice boom and its ice cover.

CONSTRUCTION AND PERFORMANCE OF THE HESS CREEK EARTH FILL DAM, LIVEN-

GOOD, ALASKA.
Simoni, O.W., Northern engineer, Fall 1975, 7(3), p.23-34, Also presented at the American Society of Civil Engineers, Alaska Section, Annual Meeting, Fairbanks, September 18-29, 1973. See also 27-177, The 104 See Section of Sect TR 196.

PERMAFROST BENEATH EARTH DAMS. STRUCTURES, PERMAPROST PRESERVATION, HYDRAULIC FILL, BARTH FILLS, UNITED STATES—ALASKA—LIVENGOOD.

SNOW ACCUMULATION FOR ARCTIC FRESH-WATER SUPPLIES.

Slaughter, C.W., et al, Arctic bulletin, 1975, 1(5), p.218-224, 15 refs. For another version see 29-3345. Mellor, M., Sellmann, P.V., Brown, J., Brown, L. 31-3104

WATER SUPPLY, SNOW ACCUMULATION, RUNOFF, MELTWATER, SNOW FENCES.

MP 861 APPROXIMATE ANALYSIS OF MELTING AND FREEZING OF A DRILL HOLE THROUGH AN ICE SHELF IN ANTARCTICA.

Tien, C., et al, Journal of glaciology, 1975, 14(72), p.421-432, 3 refs. Yen, Y-C.

30-3106

ICE DRILLS, BOREHOLES, FREEZE THAW TESTS, ICE SHELVES, ANALYSIS (MATH-EMATICS).

An approximate analysis is made, of the processes of melting and freezing of a drill hole, 500 m in depth and 0.15 m in initial radius, through an ice shelf in Antarctica. Results are expressed in graphical form showing the time available for experimentation under the hole as a function of heating duration. It is also found that refreezing has a much slower rate than melting. (Auth.)

REMOTE SENSING PLAN FOR THE AIDJEX MAIN EXPERIMENT.

Weeks, W.F., et al, Arctic Ice Dynamics Joint Experiment.

AIDJEX bulletin, July 1975, No.29, p.21-48, 14 refs.

Campbell, W.J. 30-2440

REMOTE SENSING, SPACECRAFT, AIRBORNE EQUIPMENT, SEA ICE, ICE COVER THICKNESS, DATA PROCESSING.

This operational plan describes the platforms and sensors that are expected to participate in AIDJEX, explains how they will be used to obtain the required data, discusses the analysis of those data, and points out weaknesses in the remote sensing plan as now formulated. The details of the plan have changed constantly as an overall remote

sensing strategy was being developed. This document presents the state of the plan as of the start of the field program, in March 1975.

MP 863

ICE FORCES ON MODEL STRUCTURES.

Zabilansky, L.J., et al, Canadian journal of civil engineering, 1975, 2(4), p.400-407, In English with French summary. 11 refs.

summary. 11 refs. Nevel, D.E., Haynes, F.D. 30-3095

ICE PRESSURE, HYDRAULIC STRUCTURES, PILE STRUCTURES, MODELS, LABORATORY

TECHNIQUES.
Laboratory tests on freshwater ice were conducted by using model structures of various geometries. Vertical and sloping pile sections with diameters up to 36 in. (91.4 cm) were pushed through the ice with an active testing system. The test variables investigated were size, shape, velocity, and slope or angle from the vertical. The data gathered in this study indicates that nominal ice pressure varies indirectly with pile width/ice thickness (D/T) ratio in the range of 1:10. There was no apparent change in nominal ice pressure due to the change of the pile shape. Data gathered in the velocity tests suggests an inverse effect upon the ice pressure, especially at speeds greater than 3 in/s (7.6 cm/s). In the sloping pile tests it was found that the ice pressure decreased with an increase in the sloping pile tests that failed in bending was developed. Values for this linear correlation were found graphically. A comparison of the test results with other investigations is also presented.

MP 864

MP 864

ICE FORCES ON SIMULATED STRUCTURES. Zabilansky, L.J., et al, International Symposium on Ice Problems, 3rd, Hanover, New Hampahire, 18-21 Au-gust 1975. Proceedings, International Association of gust 1975. Proceedings, International Association of Hydraulic Research, 1975, p.387-396, 1 ref. Nevel, D.E., Haynes, F.D.

ICE PRESSURE, LOADS (FORCES), OFFSHORE STRUCTURES, PILE STRUCTURES, MODELS.

Simulated structures mounted on a portable apparatus were used to investigate ice forces on marine structures. Various geometric shapes of simulated structures or piles were pushed against natural lake ice. Parameters varied were size, shape, pile velocity, friction, initial pile-ice contact and alope of the pile.

INVESTIGATION OF WATER JETS FOR LOCK WALL DEICING

WALL DELCTING.
Calkins, D.J., et al, International Symposium on Jet
Cutting Technology, 3rd, Chicago, May 11-13, 1976,
Proceedings, 1976, p.G2/13-22, 17 refs.
Mellor, M.

31-1898 ICE REMOVAL, WALLS, CHANNELS (WATER-

MP 866

TECHNIQUES FOR STUDYING SEA ICE DRIFT AND DEFORMATION AT SITES FAR FROM LAND USING LANDSAT IMAGERY. Hibler, W.D., III, et al, International Symposium on Remote Sensing of Environment, 10th, Oct.6-10, 1975, 1976, p.595-609, ADA-041 579, 12 refs. Tucker, W.B., Weeks, W.F. 31-1995

SEA ICE, DRIFT, ICE DEFORMATION, REMOTE SENSING, SPACEBORNE PHOTOGRAPHY, ACCURACY.

MP 867 UPLAND ASPEN/BIRCH AND BLACK SPRUCE STANDS AND THEIR LITTER AND SOIL PROPERTIES IN INTERIOR ALASKA.

Troth, J.L., et al, Forest science, Mar. 1976, 22(1), p.33-44, 17 refs.
Deneke, F.J., Brown, L.
31-1895

ARCTIC LANDSCAPES, TREES (PLANTS), FOR-EST SOILS, SOIL CHEMISTRY, ALPINE VEGE-TATION. ALPINE SOILS.

TATION, ALPINE SOILS.
This study characterizes upland forest stands in interior Alaska and compares and contrasts their organic and soil properties. Stand data are presented for tree and sapling species in three aspen/birch and four black spruce stands. Litter layers had greater mass and were more acidic beneath sapen/birch contained higher concentrations of C, N, P, Ca, Mg, Mn, and Zn than did black spruce organic layers. Organic layer K and Fe concentrations were similar beneath the two stand groups. Total organic layer N, P, and Zn mass were similar in the two stand groups, more Ca, Mg, and Mn were present beneath hardwoods, and more K was present beneath black spruce. Extractable soil P decreased rapidly with increasing profile depth beneath aspen/birch stands, but increased with depth to a maximum at or below 15-30 cm beneath hardwoods than beneath coniferous communities. Soils beneath the two stand groups could not be consistently separated by differences in pH, %C, %N,

or C/N ratio. Percentage soil carbon at all depths and in all stands was closely correlated with %N (r=0.97) and CEC (r=0.98).

FEASIBILITY STUDY OF LAND TREATMENT OF WASTEWATER AT A SUBARCTIC ALASKAN

Sletten, R.S., et al, Hanover, N.H., U.S. Army Cold Regions Research and Engineering Laboratory, 1976, 21p., 10 refs., Presented at the 8th Annual Waste Management Conference, Rochester, N.Y., April 28-30, 1976. Unpublished manuscript.

Uiga, A. 31-1949

WASTE TREATMENT, WATER POLLUTION, SUBARCTIC LANDSCAPES, SUBARCTIC CLIMATE, TESTS, UNITED STATES—ALASKA.

MP 869 LET'S CONSIDER LAND TREATMENT, NOT LAND DISPOSAL.

Howella, D.H., et al, Civil engineering, Mar. 1976, 46(3), p.60-62, Comments on J.V. Bentz's paper (see 31-1946).

Uiga, A., Wallace, A.T. 31-1947

WASTE DISPOSAL, WASTE TREATMENT, SEW-AGE TREATMENT, WATER POLLUTION, STANDARDS.

MP 870

WASTEWATER REUSE AT LIVERMORE, CALI-FORNIA.

Uiga, A., et al, Annual Cornell Agricultural Waste Management Conference, 8th, Rochester, N.Y., April 28-30, 1976. Proceedings, Ann Arbor, Mich., Ann Arbor Science Publishers, 1976, p.511-531, 24 refs. Iskandar, I.K., McKim, H.L. 31-1493

WATER TREATMENT, WASTE DISPOSAL, SOIL CHEMISTRY.

MP 871

Colbeck, S.C., Water resources research, June 1976, 12(3), p.523-527, 12 refs. 31-2958 ANALYSIS OF WATER FLOW IN DRY SNOW.

31-2938 SNOW PERMEABILITY, WATER RETENTION, WATER FLOW, SNOW THERMAL PROPER-TIES, SNOW WATER CONTENT, METAMOR-PHISM (SNOW), WET SNOW, SNOW HY-DROLOGY.

The equations describing water movement in a dry snow cover are derived, and examples of flow through ripe, refrozen, and fresh snows are given. The grain size of snow has a large effect on the timing of water discharge. Water is retained by dry snow to raise its temperature and satisfy the irreducible water saturation. These requirements delay reduce runoff following rain on dry

MP 872 RED AND NEAR-INFRARED SPECTRAL RE-FLECTANCE OF SNOW.

PLECTANCE OF SNOW.

O'Brien, H.W., et al, Operational Applications of Satellite Snowcover Observations. The proceedings of a workshop held Aug. 18-20, 1975, Waystation, South Lake Tahoe, Calif, ed. by A. Rango, Washington, D.C., National Aeronautics and Space Administration, 1975, p. 345-360, For the same article from a different source see 29-4002 3 refs. source see 29-4002. 3 refs. Munis, R.H.

30-3521

SNOW OPTICS, SNOW COVER DISTRIBUTION. REFLECTIVITY, INFRARED SPECTROSCOPY. MP 873

USA CRREL SHALLOW DRILL

Rand, J.H., Ice core drilling, edited by J.F. Splettstoesser, Lincoln, University of Nebraska Press, 1976, p.133-137, 1 ref.

ICE CORING DRILLS, DRILLING, FIRN.

ICE CORING DRILLS, DRILLING, FIRN.

The USA CRREL shallow drill is an electromechanical device designed for continuous coring in firm and ice to a depth of 100 m. The drill bores a 14-cm-diameter hole while obtaining a core 10 cm in diameter at a penetration rate up to 1 m/min in -20C ice. The cuttings are transported by spiral brush auger flights to a container above the corestorage section. The core and cuttings are removed from the drill after each 1 m run. Additional components include: 100 m of a seven-conductor electromechanical cable, a 6.8-m tower, a hoist which is ski-mounted, and a three-phase 220-V AC gasoline generator. All the equipment has been designed to be transported in a Twin Otter ski-equipped plane and assembled and operated by two men. The total weight of the drill and associated components is \$18 kg. The minimum estimated time required to drill 100 m and retrieve core is 15 hours. Excellent core was obtained in a record drilling time of 15 h from a 100-m hole drilled in early Nov. at the South Pole under the new geodesic dome. A second 100-m hole was drilled on the Ross Ice Shelf. the new geodesic dome.

POLAR ICE-CORE STORAGE FACILITY. Langway, C.C., Jr., Ice core drilling, edited by J.F. Splettstoesser, Lincoln, University of Nebraska Press, 1976, p.71-75, 8 refs. 30-3482

ICE CORES, COLD STORAGE.

ICE CORES, COLD STORAGE.

The U.S. Army Cold Regions Research and Engineering Laboratory (USA CRREL) has responsibility for the central storage and curatorial activities of the ice cores recovered in the Office of Polar Programs/National Science Foundation (OPF/NSF) Arctic and Antarctic research programs. The main purpose of the central ice-core storage facility is to handle, process, catalog and distribute the ice cores drilled in the polar regions to OPF-approved recipients for glaciological research. Under the agreement with OPF, the ice cores are stored at CRREL and in a commercial freezer facility at Littletown, N.H.; a technician handles and catalogs them. A core data bank is maintained for retrieval and information exchange, and starting with the Dys 3 ice core, is being computerized. The storage facilities are described. Recent developments include a cooperative analysis program between CRREL, the University of Copenhagen, and the University of Bern, a particle analysis lab, a core stratigraphy and logging routine, and a surface pit/ice-core correlation system.

MP 875 HOVERCRAFT GROUND CONTACT DIREC-TIONAL CONTROL DEVICES.

Abele, G., International Hovering Craft, Hydrofoil and Advanced Transit Systems Conference, 2nd, Amsterdam, May 17-20, 1976. Proceedings, London, Kalerglic Publications, 1976, p.51-59, 6 refs. 31-1996

31-1990 ALL TERRAIN VEHICLES, AIR CUSHION VEHI-CLES, VEHICLE WHEELS, ENVIRONMENTAL IMPACT, TUNDRA TERRAIN, IMPACT.

CLES, VEHICLE WHEELS, ENVIRONMENTAL IMPACT. TUNDRA TERRAIN, IMPACT.

The maneuverability of a hovercraft can become a serious operational problem where the craft's travel route is restricted by obstacles or requires close-quarter turns, and during travel on slopes and in crosswind conditions. While improvement and perfection of serodynamic methods may be a more desirable approach, there is a practical limit to these methods, and the use of ground contact devices requires consideration to provide more positive directional control. Wheels deserve special attention, and therefore are analyzed in more detail because of their obvious application on a variety of land terrains. Brake rods and harrows are more suitable on water, ice and snow. The saucer would cause the least ecological impact on fragile organic terrains such as tundra. The use of controlled ground contact with skirt sections having retractable rollers or special wearing surfaces may represent the least significant change to the basic design of the craft or its components. The relative directional stability is evaluated in terms of the total yswing moments produced by a variety of wheel arrangements (single, dual, tandem), location on the craft, and operational modes (frevolling, braked, or a combination of the two). The available moments are plotted against the yaw angle of the craft to determine the most effective operational mode with a particular wheel arrangement for any yaw condition. The analysis is limited to retractable devices which act as moment-producing brakes or rollers and do not serve as either propulsion or load support aids.

SPREAD OF CETYL-1-C14 ALCOHOL ON A MELTING SNOW SURFACE.

Meiman, J.R., et al, International Association of Scientific Hydrology. Bulletin, Sep. 1966, 11(3), p.5-8, 3 refs. Microform No. SIP 25051. Slaughter, C.W.

SNOW SURFACE, SNOW PERMEABILITY, SNOW MELTING, DISTRIBUTION, SNOW EVAPORATION.

The primary objective of the study was to gain information on the rate of spread of cetyl alcohol on a melting snow surface. Point applications of radioactive cetyl-1-C14 alcohol were placed on the surface of snow contained in cubical wooden boxes 25 cm on each side. The boxes with snow were placed in a controlled environment of 2C and with a relative humidity of 95%. Under the study conditions cetyl alcohol spread as far and 10 cm within and with a relative humidity of 95%. Under the study conditions, cetyl alcohol spread as far as 10 cm within 1 hr and 15 min. Distribution of the alcohol over the surface was highly variable. (Auth.)

MP 878 FIRE IN THE NORTHERN ENVIRONMENT-A SYMPOSIUM.

Slaughter, C.W., ed, Portland, Oregon, U.S. Pacific Northwest Forest and Range Experiment Station, 1971, 275p., Numerous refs. passim. Barney, R.J., ed, Hansen, G.M., ed. 26-2733

FOREST FIRES, FIRES, ENVIRONMENTAL IMPACT, PERMAFROST, TAIGA.

Comprised of 21 papers on fire, its control and effects on the Alaska environment.

MP 879

ON THE DETERMINATION OF HORIZONTAL FORCES A FLOATING ICE PLATE EXERTS ON A STRUCTURE.

Kerr, A.D., Journal of glaciology, 1978, 20(82), p.123-134, 26 refs. 32-4451

ICE PRESSURE, ICE LOADS, ICE COVER STRENGTH, STRUCTURES, LOADS (FORCES),

FLOATING ICE.

At first, the general approach for calculating the horizontal forces an ice cover exerts on structures is discussed. Ice-force determination consists of two parts: (1) the analysis of the in-plane forces, assuming that the ice cover remains intact; and (2) the use of a failure criterion, because an ice force cannot be larger than the force capable of breaking up the ice cover. For an estimate of the largest ice force, an elastic plate analysis and a failure criterion are often sufficient. A review of the literature revealed that in the majority of the analyses, it is assumed that the failure load is directly related to a "crushing strength" of the ice cover. Observations in the field and tests in the laboratory show, however, that in some instances the ice cover failed by buckling. Subsequently, the ice-force analyses based on the buckling failure mechanism are reviewed, and their shortcomings are pointed out. A new method of analysis, which is based on the buckling of a floating ice wedge, is then presented.

MP 880

TUNDRA BIOME APPLIES NEW LOOK TO ECOLOGICAL PROBLEMS IN ALASKA.

Brown, J., Northern engineer, Summer 1970, 2(2), p.9. 31-4048

ECOSYSTEMS, ENVIRONMENTS, TUNDRA BIOME, ENVIRONMENTAL PROTECTION, RESEARCH PROJECTS, ARCTIC REGIONS, UNITED STATES—ALASKA.

TUNDRA BIOME PROGRAM.

Brown, J., Science, Feb.27, 1970, Vol.167, p.1278. 31-4049

ECOSYSTEMS, ENVIRONMENTS, TUNDRA BI-OME, RESEARCH PROJECTS.

HEAT TRANSPER BETWEEN A FREE WATER JET AND AN ICE BLOCK HELD NORMAL TO

Yen, Y.-C., Letters in heat and mass transfer, Jul/Aug. 1976, 3(4), p.299-307, 2 refs. 31-242

HEAT TRANSPER COEFFICIENT, ICE MELT-ING, HYDRAULIC JETS, NOZZLES.

GENERATION OF RUNOFF FROM SUBARC-TIC SNOWPACKS.

Dunne, T., et al, Water resources research, Aug. 1976, 12(4), P.677-685, 13 refs.
Price, A.G., Colbeck, S.C.
31-773

SNOW COVER, RUNOFF, MODELS, CANADA-LABRADOR.

LABRADOR.

A physically based model of the movement of water through snowpscks was used to calculate hydrographs generated by diurnal waves of anowmelt on the tundra and in the boreal forest of subarctic Labrador. The model was tested against measured hydrographs from hilliside plots that sampled a range of aspect, gradient and length, vegetative cover, and snow depth and density. The model yielded good results, particularly in the prediction of peak runoff rates, though there was a slight overestimate of the lag time. A comparison of predictions with field measurements indicated that given the ranges over which each of the controls is likely to vary, the two most critical factors controlling the hydrograph are the snow depth and the melt rate, which must be predicted precisely for short time intervals. Permeability of the mowpack is another important control, but it can be estimated closely from published values.

BEARING CAPACITY OF FLOATING ICE PLATES SUBJECTED TO STATIC OR QUASI-STATIC LOADS.

Kerr, A.D., Journal of glaciology, 1976, 17(76), p.229-268, Bibliography p. 263-268, In English with French and German summaries.

FLOATING ICE, BEARING STRENGTH, STATIC LOADS, BIBLIOGRAPHIES.

This paper contains a critical survey of the literature on the bearing capacity of floating ice plates. It consists of a discussion of general questions, a critical survey of analytical attempts to determine the bearing capacity of floating ice plates and a survey of field and laboratory tests on floating ice plates and their relation to the analytical results. It concludes with a systematic summary of the results, a discussion of observed shortcomings, and suggestions for needed investigations.

MP 225 SUBSURFACE EXPLORATIONS IN PERMA-

Cass, J.R., Jr., American Society of Civil Engineers. Soil Mechanics and Foundation Division. Journal, Oct. 1959, 85(SM5), p.31-41, See also SIP-17852. Discussion by H.W. Stevens and W.P. Verville, Ibid., June 1960, 86(SM3), p.63-67. 10 refs. Stevens, H.W., Verville, W.P. 31-1874

PERMAFROST PERMAFROST SAMPLERS, SUBSURFACE INVESTIGATIONS, CORE SAMPLERS, FROZEN GROUND, DRILLING.

Soil sampling techniques used in two subsurface investigation programs undertaken in the Arctic are described and compared. Since the methods used were only pertially successful in recovering samples for field testing, recommendations are made for the development of boring procedures which should prove to be more satisfactory.

PORTABLE INSTRUMENT FOR DETERMINING SNOW CHARACTERISTICS RELATED TO TRAFFICABILITY.

Parrott, W.H., et al, International Conference on Terrain-Vehicle Systems, 4th, Stockholm, April 24-28, 1972. Proceedings. Vol.2, Stockholm, Sweden, 1972, p.193-204, 7 refs.
Ueda, H.T., Abele, G.

31-1796

SNOW STRENGTH, SNOW COVER STABILITY, MEASURING INSTRUMENTS, TRAFFICABILITY, SHEAR PROPERTIES.

A new, portable one-man operated instrument was developed to simplify the measuring of snow properties required for evaluating the trafficability of a snow over and to predict vehicle performance. The 16-lb instrument with interchangeable plates of various sizes is capable of providing data for computing the vertical strength armsters remarkers. changeable plates of various sizes is capable of providing data for computing the vertical strength parameters n and k and the horizontal strength parameters c and l. The vertical load is applied manually, the predetermined contact pressures are indicated by a system of signal lights connected to a force control switch type force gage, the manually (push-button) activated torque motor for the shear test is driven by a 12-volt battery. A second man is needed to record sinkage and torque data during the test.

SOME EFFECTS OF AIR CUSHION VEHICLE OPERATIONS ON DEEP SNOW.

Abele, G., et al, International Conference on Terrain-Vehicle Systems, 4th, Stockholm, April 24-28, 1972. Proceedings. Vol.2, Stockholm, Sweden, 1972, Proceedings. V p.214-241, 2 refs. Parrott, W.H.

31-1798

AIR CUSHION VEHICLES, SNOW DEPTH, ERO-SION, SURFACE PROPERTIES, TESTS.

SION, SURFACE PROPERTIES, TESTS.

Travel with an Sk-5 ACV over soft anow results in surface deformation/erosion of a few inches, caused primarily by rear skirt drag; on windswept snow only scratches can be seen. During hovering on soft snow, deformation below the cushion chamber usually does not exceed a few inches. The action of the air flow (escape velocity 70 to 120 ft/sec) produces a 1-ft ditch below the peripheral skirt in less than a minute; thereafter the extent of crosion does not increase appreciably during continued hovering. A partial seal between the inner face of the skirt (above fingers) and the snow surface may exist, arresting further acttling of the vehicle. Relatively cohesive layers of snow such as windslabs and crusts are not croded. A level snow cover, regardless of how deep or soft, does not appear to be capble of immobilizing an ACV of this and larger size. Some operational problems and their degree of severity, such as visibility, snow accumulation and adhesion to vehicle, skirt drag, effect of terrain surface porosity and presence of vegetation, are also discussed.

ICE REMOVAL FROM THE WALLS OF NAVI-GATION LOCKS.

Frankenstein, G.E., et al, Symposium on Inland Waters for Navigation, Flood Control and Water Diversions, Colorado State University, August 10-12, 1976. Proceedings, 1976, p.1487-1496, 4 refs. Wuebben, J.L., Jellinek, H.H.G., Yokota, R.

JI-1800 ICE REMOVAL, WALLS, CHANNELS (WATER-WAYS), ICE PREVENTION, PROTECTIVE COATINGS, ICE NAVIGATION, ICE ADHE-SION, DEICING.

20-YR OSCILLATION IN EASTERN NORTH AMERICAN TEMPERATURE RECORDS. Mock, S.J., et al, *Nature*, June 10, 1976, 261(5560), p.484-486, 8 refs. Hibler, W.D., III.

AIR TEMPERATURE, PERIODIC VARIATIONS, SOLAR ACTIVITY, METEOROLOGICAL DATA.

MP 890 APPLICATIONS OF THERMAL ANALYSIS TO COLD REGIONS.

Sterrett, K.F., Roundtable Discussion on Thermal Analysis Techniques, Cincinnati, Ohio, June 1976. Proceedings, 1976, p.167-181, 15 refs. 31-1802

THERMAL ANALYSIS, FROZEN GROUND PHYSICS, UNPROZEN WATER CONTENT, CLAY MINERALS, ICE WATER INTERFACE, LOW TEMPERATURE TESTS.

The author discusses the low temperature behavior of several samples of frozen soils taken from the dry valleys of Antarctica. The samples were composed of various clay minerals and had varying water contents.

It is demonstrated that some of the water remains unfrozen and that there is a dependency between the unfrozen portion and the surface area of the sample. It was pointed out that problems arising from the umfrozen water content of soils are of great interest to CRREL researchers as is the analysis of ice cores from Greenland and Antarctica as a technique for establishing past climates and in predicting future climates. The author discusses the low temperature behavior of several

OVERVIEW OF LAND TREATMENT FROM CASE STUDIES OF EXISTING SYSTEMS.

Uiga, A., et al, Hanover, N.H., U.S. Army Cold Reoign, Research and Engineering Laboratory, 1976, 26p., Presented at the 49th Annual Water Pollution Control Federation Conference, Minneapolis, Minneapolis, 4-8 October 1976. 16 refs. Sletten, R.S.

31-1803 WASTE TREATMENT, WATER TREATMENT, WATER POLLUTION, SOIL CHEMISTRY, COST ANALYSIS, CLIMATIC FACTORS.

ANALYSIS, CLIMATIC FACTORS.

Wastewater treatment by land application is described for sites at Calumet, Michigan (88 years); Quincy, Washington (20 years); Manteca, California (11 years); and Livermore, California (8 years). All sites meet on an average the USPHS drinking water limit of 10 mg/l for NO3-N. Preapplication treatments vary for the site: Calumet, undisinfected, no treatment; Quincy, undisinfected, primary treatment; Manteca, undisinfected, secondary treatment and Livermore, disinfected, secondary treatment. The preapplication treatment and total operation and maintenance costs are: 3c/1000 gallons for Culmet, 20c/1000 gallons for Quincy, 27c/1000 gallons for Calumet, 20c/1000 gallons for Livermore. Although minor individual site problems are discussed and solutions presented, the authors conclude that land application offers year round treatment alternatives within variable climates.

MP 892

LIFE-CYCLE COST EFFECTIVENESS OF MODULAR MEGASTRUCTURES IN COLD RE-GIONS.

Wang, L.R.-L., et al, International Symposium on Housing Problems, Atlants, Georgia, May 24-28, 1976, 1976, p.760-776, 7 refs. Tobiasson, W.

31-1804

RESIDENTIAL BUILDINGS, COLD WEATHER CONSTRUCTION, CONSTRUCTION COSTS, ARCTIC CLIMATE, WINTER MAINTENANCE, STRUCTURES.

ICE ENGINEERING COMPLEX ADOPTS HEAT PUMP ENERGY SYSTEM.

Aamot, H.W.C., Energy international, Jan 1977, 14(1), p.25-26, Comments p.3. 31-1805

HEAT RECOVERY, HEATING, COOLING SYSTEMS, HEAT TRANSFER, TRANSITION HEAT-

MP 894

ARCTIC TRANSPORTATION: OPERATIONAL AND ENVIRONMENTAL EVALUATION OF AN AIR CUSHION VEHICLE IN NORTHERN ALASKA.

Abele, G., et al, American Society of Mechanical Er gineers, 1976, 7p., Presented at the Petroleum Mechanical Engineering and Pressure Vessels and Piping Conference, Mexico City, Mexico, September 19-24, 1976. Paper No.76-Pet-41. 8 refs.

31-1845

AIR CUSHION VEHICLES, TRAFFICABILITY, COST ANALYSIS, ENVIRONMENTAL IMPACT, REVEGETATION, ARCTIC TERRAIN, TESTS.

Traffic tests conducted near Barrow, Alaska with a 7-ton SK-5 Air Cushion Vehicle have shown that these types of vehicles can provide year-round high-speed transport capability over a variety of relatively level, low strength terrains. The ecological impact of ACV traffic over easily degradable tundra terrains is not nearly as significant as that of wheeled or tracked vehicle traffic.

MP 895 CIRCULATION AND SEDIMENT DISTRIBU-TION IN COOK INLET, ALASKA.

Gatto, L.W., Alaska. University. Institute of Marine Science. Occasional Publication, 1976, No.4, Assessment of the Arctic marine environment, edited by D.W. Hood, D.C. Burrell, and E. Kelley. Based on a symposium held in conjunction with Third International Conference on Port and Ocean Engineering Under Arctic Conditions, POAC-75, held in Fairbanks, Alaska, Aug. 11-15, 1975., p.205-227, 18 refs. 31-1935

SEDIMENT TRANSPORT, WATER FLOW, SEA ICE DISTRIBUTION, SPACEBORNE PHOTOGRAPHY, OCEAN CURRENTS, UNITED STATES ALASKA—COOK INLET.

—ALASKA—COOK INLET.

The purpose of this investigation was to analyze surface circulation, suspended sediment distribution, water-type migration, and tidal flushing mechanisms, utilizing medium and high altitude aircraft and repetitive synoptic satellite imagery with corroborative ground truth data. LANDSAT-1 and -2 and NOAA-2 and -3 imagery provided observations of surface currents, water type migrations and sediment and sea ice distributions during different seasons and tides. NASA NP-3A and U-2 aircraft multispectral imagery was used to analyze coastal processes, i.e., currents and sediment dispersion in selected areas.

Ground truth data were utilized in the interpretation of the sirroraft and satellite imagery. uspersion in selected areas. Ground truth data were utilized in the interpretation of the aircraft and satellite imagery and verified many of the regional circulation patterns inferred from the suspended sediment patterns apparent on the imagery. Several local circulation patterns not previously reported were identified.

MP 896

RECLAMATION OF WASTEWATER BY AP-PLICATION ON LAND.

lakandar, I.K., et al, Hanover, N.H., U.S. Army Cold Regions Research and Engineering Laboratory, 1976, 15p., Presented at the U.S. Army Science Conference, Research Triangle Park, North Carolina, June 1976.

Leggett, D.C. 31-1901

WASTE TREATMENT, WATER TREATMENT, WATER CHEMISTRY, SEEPAGE, SOIL CHEMIS-TRY, WASTE DISPOSAL.

The capacity of a slow infiltration land treatment system to renovate wastewater in cold regions was investigated using six outdoor test cells. The principal mechanisms for nitrogen to renovate wastewater in cold regions was investigated using six outdoor test cells. The principal mechanisms for nitrogen removal were found to be plant uptake and denitrification; phosphorus was removed by plant uptake and immobilization in the surface soil layer; heavy metals were removed by sorption or precipitation in the top few centimeters of soil. Nitrogen removal was found to be seasonally dependent, the greatest losses occurring in the spring and summer and the least during fail and winter. This was due to the absence of plant uptake during winter and the effect of temperature on the conversion of ammonium to nitrate nitrogen clirification, which caused significant amounts of NIM4 to temperature on the conversion of ammonium to nitrate nitrogen (nitrification), which caused significant amounts of NH4 to be stored during winter and released in spring, giving rise to a period of high NO3 concentration in the leachate. Application of 15 cm/wek of secondary effluent to sandy loam soil resulted in diminished water quality (>10 mg/d of nitrate-N) during most of the year. With the exception of this heavy treatment experiment, heavy metals and phosphorus were confined to the top 15 cm of the soil. Application of effluents containing ppm levels of heavy metals to forages did not appear to cause phytotoxic effects. As for other water quality parameters (organic-C, BOD, suspended solids, fecal coliform) renovation of the wastewater was essentially complete. tially complete.

MP 897

DEVELOPMENT OF A REMOTE-READING TENSIOMETER/TRANSDUCER SYSTEM FOR USE IN SUBFREEZING TEMPERATURES. McKim, H.L., et al, Conference on Soil-Water Prob-

lems in Cold Regions, 2nd, Edmonton, Sep. 1976, Proceedings, 1976, p.31-45, 18 refs.
Berg, R.L., McGaw, R., Atkins, R.T., Ingersoll, J. 31-1905

SOIL WATER, VAPOR PRESSURE, MEASURING INSTRUMENTS, SOIL FREEZING, FREEZE THAW TESTS. REMOTE SENSING.

MP 898 GALERKIN FINITE ELEMENT ANALOG OF

FROST HEAVE.
Guymon, G.L., et al, Conference on Soil-Water Problems in Cold Regions, 2nd, Edmonton, Sep. 1976, Proceedings, 1976, p.111-113, 3 refs.
Berg, R.L.
31-1911

FROST HEAVE, MATHEMATICAL MODELS.

MP 899 SIMPLE PROCEDURE TO CALCULATE THE VOLUME OF WATER REMAINING UNFROZ-EN IN A FREEZING SOIL.

McGaw, R., et al, Conference on Soil-Water Problems in Cold Regions, 2nd, Edmonton, Sep. 1976, Proceedings, 1976, p. 114-122, 6 refs.
Tice, A.R.

31-1912

PROZEN GROUND PHYSICS, SOIL FREEZING, UNFROZEN WATER CONTENT.

SEASONAL VARIATIONS IN APPARENT SEA ICE VISCOSITY ON THE GEOPHYSICAL SUALE. Hibler, W.D., III, et al, Geophysical research letters, Feb. 1977, 4(2), p.87-90, 12 refs. Tucker, W.B. 31-3240

SEA ICE, VISCOSITY, DRIFT, ICE GROWTH, ICE PHYSICS, VISCOUS FLOW, SEASONAL VARIA-

ITONS. Using available atmospheric pressure and ocean current data and estimating non-local stress transferral through the ice cover by employing a viscous drift model in the infinite boundary limit, predicted drift rates for one Russian and two U.S. drifting stations are made over the time period May 1962 to April 1964. The viscosity values giving the best fit between observed and predicted values show a reseasured winter increase that correlates well with the the best fit between observed and predicted values show a pronounced winter increase that correlates well with the ice growth rate. Phaically this suggests that ice drift rates (for a given wind field) tend to decrease in winter because of increased stress transferral through the ice cover. An empirical linear relationship between viscosity and ice growth rate is derived which yields predictions in reasonable agreement with both long (yearly) and short term (monthly) observed drift rates.

MP 901

SEGREGATION-FREEZING

SEGREGATION-FREEZING TEMPERATURE AS THE CAUSE OF SUCTION FORCE.
Takagi, S., International Symposium on Frost Action in Soils, Luleå, Sweden, Feb. 1977. Proceedings, Vol.1, University of Luleå, 1977, p.59-66, 17 refs.

GROUND ICE, ICE LENSES, SOIL WATER MI-GRATION, FROZEN GROUND THERMODY-NAMICS, SOIL PRESSURE.

NAMICS, SOLL PRESSURE.

A new freezing mechanism, called segregation freezing, is proposed, to explain the generation of the suction force that draws pore water up to the freezing surface of a growing ice lens. The segregation-freezing temperature is derived by applying thermodynamics to soil mechanics concept that distinguishes the mechanically effective pressure from the mechanically neutral pressure. The frost-heaving pressure appears in the solution of the differential equations for the simultaneous flow of heat and water, of which the segregation-freezing temperature is one of the boundary conditions.

PERIODIC STRUCTURE OF NEW HAMP-SHIRE SILT IN OPEN-SYSTEM FREEZING.

McGaw, R., International Symposium on Frost Action in Soils, Lulea, Sweden, Feb. 1977. Proceedings, Vol.1, University of Lulea, 1977, p.129-136, 2 refs. 31-2074

SOIL FREEZING, SOIL STRUCTURE, WATER TABLE, GROUND ICE.

TABLE, GROUND ICE.

The periodic frozen structure of a glacially-deposited silt soil is analyzed using a metric grouping of sizes. Four specimens were frozen simultaneously in open-system freezing with initial water tables ranging from 15 cm (6 in.) to 105 cm (42 in.). Rate of freezing varied from near zero to 0.80 mm/hr. Measurements on the average thickness of individual ice layers and residual soil layers are tabulated and graphed for each specimen, with water-table depth and rate-of-freezing as independent variables. The data show that the ice-layer thickness decreases continuously with freezing rate for each of the four water-table depths. The maximum ice-layer thickness (4.5 mm) occurred with the highest water table and the slowest freezing. In contrast, the residual soil layer develops a maximum thickness for this soil in the 0.30 to 0.40 mm/hr range of freezing rates. The peak value (2.5 mm) occurred with water table depths of 45 cm (18 in.) and 75 cm (30 in.). In addition, the two specimens with the highest water tables developed a major secondary peak at very slow rates of freezing (less than 0.10 mm/hr), giving evidence of a separate mode of freezing.

CARBON DIOXIDE DYNAMICS ON THE ARC-TIC TUNDRA.

Coyne, P.I., et al, International Biological Program. Tundra Biome. Structure and function of the tundra ecosystem. Vol.1, Progress report and proposal abstracts. 1971, p.48-52.

Kelley, J.J. 31-2097

TUNDRA VEGETATION, CARBON DIOXIDE, SNOW COVER EFFECT.

MP 904 SEASONAL CYCLES AND RELATIVE LEVELS OF ORGANIC PLANT NUTRIENTS ARCTIC AND ALPINE CONDITIONS. UNDER

McCown, B.H., et al, International Biological Program. Tundra Biome. Structure and function of the tundra ecosystem. Vol.1, Progress report and proposal abstracts. 1971, p.55-57.

Tieszen, L.L. 31-2099

TUNDRA VEGETATION, SEASONAL VARIA-TIONS, PLANT PHYSIOLOGY.

MP 905 ECOLOGICAL EFFECTS OF OIL SPILLS AND SEEPAGES IN COLD-DOMINATED ENVIRON-

McCown, B.H.. et al. International Biological Program. Tundra Biome. Structure and function of the tundra ecosystem. Vol.1, Progress report and proposal abstracts. 1971, p.61-65.

Brown, J., Tieszen, L.L. 31-2101

TUNDRA SOILS, TUNDRA VEGETATION, OIL SPILLS, DAMAGE, ENVIRONMENTAL IM-PACT.

ABIOTIC OVERVIEW.

Weller, G., et al, International Biological Program. Tundra Biome. Structure and function of the tundra ecosystem. Vol.1, Progress report and proposal abecosystem. Vol.1, Prog stracts. 1971, p.173-181. Brown, J.

31-2114
RESEARCH PROJECTS, TUNDRA, MICRO-CLIMATOLOGY, SOIL TEMPERATURE, MOD-ELS, BOUNDARY LAYER, SNOW COVER EF-FECT, VEGETATION PATTERNS.

PREDICTION AND VALIDATION OF TEMPER-ATURE IN TUNDRA SOILS.

Brown, I., et al, International Biological Program.
Tundra Biome. Structure and function of the tundra Tundra Biome. Structure and function of the tundra ecosystem. Vol.1, Progress report and proposal abstracts. 1971, p.193-197.

31-2116

TUNDRA SOILS, SOIL TEMPERATURE, THAW DEPTH, MATHEMATICAL MODELS, FORE-CASTING.

MP 908 TRACE GAS ANALYSIS OF ARCTIC AND SU-BARCTIC ATMOSPHERE.

Murmann, R.P., International Biological Program. Tundra Biome. Structure and function of the tundra ecosystem. Vol.1, Progress report and proposal abstracts. 1971, p.199-203.

ATMOSPHERIC COMPOSITION, GASES.

U.S. TUNDRA BIOME CENTRAL PROGRAM 1971 PROGRESS REPORT.

Brown, J., International Biological Program. aundra Biome. Structure and function of the tundra ecosys-tem. Vol.1, Progress report and proposal abstracts. tem. Vol.1, Pro 1971, p.244-270. 31-2121

RESEARCH PROJECTS.

SEA ICE CONDITIONS IN THE ARCTIC.

Weeks, W.F., Arctic loe Dynamics Joint Experiment. AIDJEX bulletin, Dec. 1976, No.34, p.173-205, Includes, as Appendix 1, a section on Ice Terminology. 31-2291

ICE CONDITIONS, SEASONAL VARIATIONS, TERMINOLOGY, ICE PHYSICS, DRIFT.

Colloquium on Water in Planetary Regoliths, Hanover, N.H., October 5-7, 1976, Hanover, N.H., U.S. Army Cold Regions Research and Engineering Laboratory, 1977, 161p., Refs. passim. For selected papers see 31-2494 through 31-2511.

EXTRATERRESTRIAL ICE, PERMAFROST HY-DROLOGY, SOIL WATER, ICE SPECTROS-

MP 912 MARS SOIL-WATER ANALYZER: INSTRU-MENT DESCRIPTION AND STATUS.

Anderson, D.M., et al, Colloquium on Water in Plane-tary Regoliths, Hanover, N.H., Oct. 5-7, 1976. Pro-ceedings, Hanover, N.H., U.S. Army Cold Regions Research and Engineering Laboratory, 1977, p.149-158, 9 refs.

Stephens, J.B., Fanale, F.P., Tice, A.R. 31-2511

MARS (PLANET), SOIL WATER, EXTRATERRE-STRIAL ICE, PERMAFROST HYDROLOGY, MEASURING INSTRUMENTS, RADIOMETRY, PERMAFROST SAMPLERS.

APPLICATIONS OF REMOTE SENSING FOR CORPS OF ENGINEERS PROGRAMS IN NEW ENGLAND.

McKim, H.L., et al, International Symposium on Remote Sensing of Environment, 10th, Ann Arbor, Oct. 6-10, 1975, Ann Arbor, Environmental Research Institute of Michigan, 1975, 8p. + 14 figs. and tables,

Merry, C.J., Cooper, S., Anderson, D.M., Gatto, L.W. 31-3652

REMOTE SENSING, AERIAL SURVEYS, SPACE-BORNE PHOTOGRAPHY, ENVIRONMENTS, UNITED STATES—NEW ENGLAND.

BORNE PHOTOGRAPHY, ENVIRONMENTS, UNITED STATES—NEW ENGLAND.

The utility of satellite, high altitude and low altitude aerial imagery is presently being critically evaluated by the Corps of Engineers. The most significant contribution to date has been to increase confidence limits by more accurately estimating parameters used in models. Within the last three years several new cooperative remote sensing programs addressing environmental and hydrologic problems have been implemented. The objectives of these programs were to determine the availability, type, scale and resolution required and to show how remote sensing methods can be utilized to augment or update conventional procedures. Imagery from LANDSAT mission provided valuable information for size evaluation, definition of geologic lineations and monitoring snow and ice accumulation and ablation. The Skylab program has defined the detail of land use mapping that can be accomplished from the \$190A and \$190B photography. Low altitude aircraft photography (scale 1:33,600) was used to determine the location of materials at a potential dam construction site which could allow a large cost saving for transportation of material as compared to original design estimates. In another program, the effect of inundation at six New England flood control reservoir was investigated. The extent and severity of tree damage were mapped and analyzed statistically. These results will be used by the Corps in the reservoir management program.

MP 114
EVALUATION AND RECOMMENDATIONS
FOR SNOWDRIFT CONTROL AT FAA ILS
FACILITIES, BARROW AND DEADHORSE,
ALASKA, FINAL REPORT.

Calkins, D.J., U.S. National Aviation Facilities Experimental Center. Report, Sep. 1976, FAA-NA-76-165, 41p., ADA-030 401.

31-2585 SNOWDRIFTS, SNOW FENCES, UNITED STATES—ALASKA—BARROW, UNITED STATES—ALASKA—DEADHORSE.

STATES—ALASKA—DEADHORSE.

The existing snowdrifting conditions are described at the Barrow and Deadhorse airfields and recommendations made for minimizing the drifting snow at the ILS facilities. The problem of drifting snow at the localizer and glide slope facilities was a result of the structures themselves creating drifts and causing outages. The most economical method of eliminating the problem at the glide slope was relocation of the instrument shelters such that they are not in line with the antenna masts and the prevailing wind direction. The localizer snowdrifts were caused by the bulkiness of the supporting structure carrying the antenna; although a selevated on piles severe turbulence develops behind the structure and the snow deposits. Wooden snowfences, 10 ft high, in parallel rows 200 ft apart will control the snow during an average snow year. Model studies of each alternative method were carried out to validate the various proposals. (Auth.)

VATOR PRESSURE OF 2.4.6-TRINITROTOL-UENE BY A GAS CHROMATOGRAPHIC HEADSPACE TECHNIQUE.

Leggett, D.C., Journal of chromatography, 1977, Vol.133, p.83-90, 23 refs. 31-2565

VAPOR PRESSURE, GAS CHROMATOGRAPHY, TRINITROTOLUENE.

TRINITROTOLUSINE.

The vapor pressure of 2.4,6-trinitrotoluene was determined by a gas chromatographic headspace technique. The vapor pressure from 12-40C was derived from the experimental data using the ideal gas law and then compared to extrapolations of literature data obtained by the Knudsen effusion technique. Excellent agreement was obtained. Advantages of the chromatographic headspace method over the effusion method were: (1) scrupulous purity was found to

TION.

be unnecessary since volatile impurities were chromatographically separated from the compound of interest, (2) the method was highly sensitive using an electron capture detector, and (3) the method was experimentally simple, requiring materials that are readily available, i.e., a gas chromatograph, a temperature bath, a few septum-capped bottles, and gas-tight syringes.

MP 916
ON THE ORIGIN OF PINGOS—A COMMENT. Mackay, J.R. Journal of hydrology (Amsterdam), 1976, Vol.30, p.295-298, Comment to H. Ryckborst's paper (see 31-2549). 10 refs. 31-2679

PINGOS, GROUND ICE, SOIL WATER, SUBSUR-FACE STRUCTURES, ACTIVE LAYER, PERMA-FROST HYDROLOGY, ICE LENSES, ORIGIN.

HIGH-LATITUDE BASINS AS SETTINGS FOR CIRCUMPOLAR ENVIRONMENTAL STUDIES. Slaughter, C.W., et al, Circumpolar Conference on Northern Ecology, Ottawa, Sep. 15-18, 1975. Pro-ceedings, Ottawa, National Research Council. Cana-da, 1975, p.IV/57-IV/68, 48 refs., In English with French summary. Santeford, H.S.

31-2564 RESEARCH PROJECTS, WATERSHEDS, ENVI-RONMENTS, INTERNATIONAL COOPERA-

may logically be conducted within the larger context of entire drainage basins—Research Watersheds.

These are catchments which represent major environmental settings (e.g., Arctic tundra, subarctic taiga) and are specifically dedicated to research.

The hydrologic cycle of a complete catchment considered from precipitation through basic, yield provides a functional and conceptual base for considering mass, nutrient, and enterey transfer questions released to research. a functional and conceptual base for considering mass, nutrient, and energy transfer questions relevant to ecosystem functioning. With proper planning and execution, advantages to be gained may include: economy of effort, better cooperation between disciplines, improved application of results to real-world problems, and enhanced potential for comparative studies among circumpolar settings. In high latitudes, where climate, transportation and logistics, available scientific manpower, and lack of good background data often combine to render research both difficult and expensive, increased efficiency through integration of complementary biological and physical studies is especially attractive. In 1974-75 a start was made toward such a circumpolar program. Through the International Hydrological Decade (IHD), initial meetings of Swedish, Canadisn, and U.S. scientists have considered objectives of facilitating communication and data exchange, and ultimately improving understanding of hydrologic functioning in high-latitude environments. In Alaska exchange, and ultimately improving understanding of hydrologic functioning in high-latitude environments. In Alaska the 104-sq-km Caribou-Poker Creeks Research Watershed provides one example of multi-disciplinary, multi-agency research into environmental and hydrological behaviour of subarctic uplands, with provision for physical and biological investigations and experimentation. Similar circumpolar efforts should prove useful in a wide variety of discipline-specific and integrated scientific efforts.

MP 918 SEA ICE PROPERTIES AND GEOMETRY.

Weeks, W.F., Arctic Ice Dynamics Joint Experiment. AIDJEX bulletin, Dec. 1976, No.34, p.137-171, Refs. p 167-171. 31-2290

SEA ICE, ICE MECHANICS, ICE PHYSICS, ICE STRENGTH, ICE COVER THICKNESS, PRESSURE RIDGES.

DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAFROST BENEATH THE BEAUFORT SEA.

Sellmann, P.V., et al. Environmental assessment of the Alaskan Continental Shelf, Vol.4. Principal investigators' reports July-September 1976, Boulder, olorado. Environmental Research Laboratories,

1976, p.53-60, 3 refs.
Berg, R.L., Brown, J., Blouin, S.E., Chamberlain, E.J., Iskandar, A., Ueda, H.T.

OFFSHORE DRILLING, DRILL CORE ANALYSIS, ENGINEERING GEOLOGY, SUBSEA PER-MAFROST

MP 920 LAND TREATMENT OF WASTEWATER—CASE STUDIES OF EXISTING DISPOSAL SYSTEMS AT QUINCY, WASHINGTON AND MANTECA, CALIFORNIA.

Murmann, R.P., et al, Waste Management Conference, 8th, Rochester, N.Y., April 28-30, 1976. Proceedings, Rochester, N.Y., 1976, 36p., 21 refs. Iskandar, I.K.

WASTE TREATMENT, WATER TREATMENT, SOIL CHEMISTRY, WATER CHEMISTRY, IRRIGATION, UNITED STATES—WASHINGTON—QUINCY, UNITED STATES—CALIFORNIA—

MANTECA.

Evaluations of long-term systems for wastewater disposal on land by slow infiltration at Manteca, California, and Quincy, Washington, are presented. Factors considered include site history, operational characteristics. Domestic undisinfected wastewater has been applied at these locations by flood irrigation for up to 20 years. At Manteca, forage vegetation (rye grass) has been continuously maintained while at Quincy a crop rotation has been practiced. The system at Quincy has been relatively heavily loaded by application of approximately 15 cm/A (6 in./A) per week while at Manteca an average of only 4.5 cm/A (1.8 in./A) of wastewater has been applied per week. At both sites a control field and two disposal fields were investigated for comparison. Representative soil samples were collected at intervals to a depth of 150 cm. These were analyzed for about 30 pertinent chemical parameters including total and plant-availsthent chemical parameters including total and plant-availa-heavy metals. Soil solution samples were collected 30- and 160-cm depths with suction lysimeters. Pretreatment water samples, peripheral drainage water and ground water samples were also collected. All water samples were analyzed in the fields for pH. NH4-N, NO3-N and ortho-P during three periods in 1974.

MP 921

PROPOSED SIZE CLASSIFICATION FOR THE TEXTURE OF FROZEN EARTH MATERIALS. McGaw, R., 1975, 10p., Presented at Les problèmes posés par la gélifraction. Recherches fondamentales et appliquées. Colloque interdisciplanaire, Paris-Le Havre, 23-25 April, 1975. Report No.311. 4 refs. 23-25.6 32-626

FROZEN GROUND, SOIL STRUCTURE, CLAS-SIFICATIONS, GROUND ICE.

SIFICATIONS, GROUND ICE.

The macroscopic fabric, or texture, of frozen earth materials represents a point-by-point summation of the microscopic nucleation, moisture flow, and heat flow around and between individual mineral particles. As such, frozen texture is intimately related to the basic mechanisms of ice segregation. A study of the details of frozen texture can lead to fundamental new knowledge on the formation and structural effects of segregated ice. A size classification derived from laboratory tests is proposed for the systematic measurement of the segregated ice. A size classification derived from isboratory tests is proposed for the systematic measurement of the characteristic (banded) element of interleaved soil and ice in fine-grained granular materials. Graphs are presented showing the relationship between the frozen texture of New Hampshire Silt and measured values of freezing rate as determined by the 0 C isotherm.

DYNAMICS OF NEAR-SHORE ICE.

Weeks, W.F., et al, Environmental assessment of the Alaskan Continental Shelf, Vol.4. Principal inves-tigators' reports July-September 1976. Boulder, Colorado, Environmental Research Laboratories, Colorado, Envi 1976, p.267-275.

Kovacs, A. 31-2630

SEA ICE, REMOTE SENSING, ICE CONDITIONS, RESEARCH PROJECTS.

INTERESTING FEATURES OF RADAR IMAGE-RY OF ICE-COVERED NORTH SLOPE LAKES. Weeks, W.F., et al, Journal of glaciology, 1977, 18(78), p.129-136, In English with French and German summaries. 15 refs. Sellmann, P.V., Campbell, W.J.

LAKE ICE, RADAR PHOTOGRAPHY, ICE WATER INTERFACE, ICE SOLID INTERFACE, ICE COVER THICKNESS, REFLECTIVITY, UNITED STATES—ALASKA—NORTH SLOPE. UNITED STATES—ALASKA—NORTH SLOPE. Side-looking airborne radar (SLAR) imagery obtained in April-May 1974 from the North Slope of Alaska between Barrow and Harrison Bay indicates that tundra lakes can be separated into two classes based on the strength of the radar returns. Correlations between the areal patterns of the returns, limited ground observations on lake depths and water compositions, and information obtained from LANDSAT imagery strongly suggest that areas of fresh-water lakes giving weak returns are frozen cumpletely to the bottom while areas giving strong returns are not. This is a reasonable interpretation inasmuch as the reflection coefficient associated with the high-dielectric rins as a the reflection coefficient associated with the high-dielectric-contrast ice-water interface would be roughly twelve times that associated with the low-contrast ice-soil interface brackish lakes also give weak returns even when they are

not completely frozen. This is the result of the brine present in the lower portion of the ice cover limiting the penetration of the X-band radiation into the ice. The ability to separate tundra lakes rapidly and easily into these two classes via SLAR should be useful in understanding wide variety of problems.

MP 924

DYNAMICS OF NEAR-SHORE ICE.

Kovacs, A., et al, Environmental assessment of the Alaskan Continental Shelf, Vol.4. Principal investigators' reports October-December 1976. Boulder, Colorado, Environmental Research Laboratories, 1977, p.106-112.

Weeks, W.F. 31-2776

SEA ICE, FAST ICE, ICE MECHANICS, RADAR ECHOES, LOGISTICS.

MP 925 PRELIMINARY EVALUATION OF NEW LF RADIOWAVE AND MAGNETIC INDUCTION RESISTIVITY UNITS OVER PERMAFROST TERRAIN.

Sellmann, P.V., et al, National Research Council, Canada. Associate Committee on Geotechnical Re-search. Technical memorandum, June 1977, No.119, Symposium on Permafrost Geophysics, Vancouver, Oct. 12, 1976. Proceedings. p.39-42. Arcone, S.A., Delaney, A.J.

32-2614

32-2014
MEASURING INSTRUMENTS, ELECTRICAL
RESISTIVITY, ELECTROMAGNETIC PROSPECTING, PERMAPROST DISTRIBUTION.

SNOW AND SNOW COVER IN MILITARY SCIENCE.
Swinzow, G.K., Fuse/Ammunition/Environment Symposium, Picatinny Arsenal, Dover, N.J., 1978, p.1-239-1-262, 26 refs.
32-2679

SNOW COVER EFFECT, MILITARY OPERA-TION, MILITARY EQUIPMENT.

TION, MILITARY EQUIPMENT.

Pertinent properties of a snow cover are thicknesses of individual layers, snow density, hardness, grain sizes and temperatures. A snow cover is subject to constant metamorphism and its occurrence is subject to seasonal and geographic distribution. A snow cover is a serious obstacle for traffic, especially military transportation. As a material, snow may be used for shelters, camouflage and fortification. Observations of attenuation of fast projectiles and fragments are reported. It is concluded that snow may be a material seriously affecting fuze mechanisms of certain projectiles and may degrade ammunition effects. Cited and recommended literature covers most of the aspects of the role of anow in warfare. MP 927

DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAPROST BENEATH THE BEAUPORT SEA.

Sellmann, P.V., et al, Environmental assessment of the Alaskan Continental Shelf, Vol.4. Principal investigators' reports October-December 1976, Boulder, Colorado, Environmental Research Laboratories, 1977, p.234-237, 1 ref.
Berg, R.L., Brown, J., Blouin, S.E., Chamberlain, E.J., Environmental Research Laboratories,

Iskandar, A., Ueda, H.T. 31-2780

SEA ICE, SUBSEA PERMAFROST.

MP 928 UTILITY DISTRIBUTION PRACTICES IN NORTHERN EUROPE.

McFadden, T., et al, Canada. Environmental Protection Service. Economic and technical review reports, Jan. 1977, EPS 3-WP-77-1, Symposium on Utilities Delivery in Arctic Regions, March 16-18, 1976, Edmonton, Alberta, Canada. p.70-95.

Aamot, H.W.C.

UTILITIES, PIPELINES, PLASTICS, POWER LINE ICING, FROST PROTECTION.

This report represents information on utility distribution systems gathered on a study trip to Scandinavia and Great Britian and Iceland. The information concerns new technology and materials in cold weather related problems and solutions

The distribution systems involved are: water and sewage times, vacuum sewage and pneumatic solid waste collection lines, heat distribution lines and electrical transmission, lines. aton lines. In Sweden much information was obtained on plastic pipes for water and a ewage lines and frost penetration protection. There are large district heating systems in operation and much information was found on heat distribution pipe systems and long distance heat transmission. In Norway, where almost all electricity is produced by hydroelectric stations, information was collected on electric transmission line using problems and self supporting aerial cables for electrical distribution. A wealth of information was gathered in London where the water and sewage systems are among the oldest and largest in the world and where some material and methods have a long history of success and other new ones are being introduced. District heating In Sweden much information was obtained

technology is also highly developed in London, but large systems have not yet evolved. Pneumatic solid wastes collection systems are being introduced.

MP 929

FREEZE DAMAGE PREVENTION IN UTILITY DISTRIBUTION LINES.

McFadden, T., Canada. Environmental Protection Service. Economic and technical review reports, Jan. 1977, EPS 3-WP-77-1, Symposium on Utilities Delivery in Arctic Regions, March 16-18, 1976, Edmonton, Alberta, Canada, p.221-231, 3 refs. 31-3082

WATER PIPES, PIPELINE FREEZING, ICE PRESSURE, PRESSURE CONTROL.

MP 930

FIELD PERFORMANCE OF A SUBARCTIC UTILIDOR. Reed, S.C., Canada. Environmental Protection Ser

vice. Economic and technical review reports, Jan. 1977, EPS 3-WP-77-1, Symposium on Utilities Delivery in Arctic Regions, March 16-18, 1976, Edmonton, Alberts, Canada. p.448-468.

UTILITIES, COLD WEATHER PERFORMANCE, FOUNDATIONS, WATER SUPPLY, WASTE DIS-

This paper describes the design, construction, performance and ultimate failure of a functioning utilidor. It is hoped that the lessons learned in this case study description will be of interest and use to engineers concerned with planning and design of such systems.

EXAMINING ANTARCTIC SOILS WITH A SCANNING ELECTRON MICROSCOPE.

Kumai, M., et al, Antarctic journal of the United States, Dec. 1976, 11(4), p.249-252, 5 refs. Anderson, D.M., Ugolini, F.C.

31-2963

SOIL CHEMISTRY, WEATHERING, MINERALOGY, X RAY ANALYSIS, ELECTRON MICROSCOPY, ANTARCTICA—BEACON VALLEY, ANTARCTICA—WRIGHT VALLEY.

Results are reported of an investigation by scanning electron microscopy (SEM) and energy dispersion X-ray analysis (EDXA) of the morphology, degree of weathering, and chemical species of six samples of soils from Beacon Valley, lateral valley adjoining Beacon Valley, and lower Wright Valley. EDXA revealed 11 elements in the soil samples: Valley. EDXA revealed 11 elements in the soil samples: sodium, magnesium, aluminum, silicon, suftur, chlorine, potassium, calcium, titanium, manganese, and iron. Chromium, palladium, and gold, used in shadowing, were also found. A typical SEM of soil from Beacon Valley showed rounded grains, which had been subjected to much mechanical and chemical weathering. Chemical species identified by EDXA for the soil of Beacon Valley is shumic, saline soil. EDXA of the soil of Beacon Valley is shumic, saline soil. EDXA of the soil of first lateral valley revealed a quartz particle showing weathering, with contamination by Na, Ca, and Fe, and CaSO4. The ahumic, saline soil of lower Wright Valley shows grains with sharp edges, indicating weak weathering and thus a relatively young age. Magnetite and silicate were found, and Fe, CaC12, and KC1 were identified using EDXA. BDXA

MP 932

GEOPHYSICAL METHODS FOR HYDROLOGI-CAL INVESTIGATIONS IN PERMAFROST RE-

Hoekstra, P., Conference on Soil-Water Problems in Cold Regions, 2nd, Edmonton, Sep. 1976, Proceedings, 1976, p.75-90, 6 refs. 31-1908

GEOPHYSICAL SURVEYS, PERMAFROST HY-DROLOGY, ELECTROMAGNETIC PROSPECT-ING, PERMAFROST INDICATORS, DISCON-TINUOUS PERMAFROST.

MP 933

EFFECT OF SNOW COVER ON OBSTACLE PERFORMANCE OF VEHICLES.

Hanamoto, B., Journal of terramechanics, Oct. 1976, 13(3), p.121-140, 11 refs. For another version see 27-2795. 31-3028

TRACKED VEHICLES, SNOW COVER EFFECT, COLD WEATHER PERFORMANCE, TOPO-GRAPHIC FEATURES, TRAFFICABILITY, TRAFFICABILITY. SNOW VEHICLES.

SNOW VEHICLES.

Trafficability of terrain is a function of soft soil, hard or rough ground, geometric obstacles, vegetation, and the riverine environment. All of these terrain aspects are altered by cold temperatures and snow cover. This paper examines the effect of snow cover on obstacle crossing performance of vehicles. The mathematical expressions describing step negotiation, trench crossing, and slope climbing on snow covered obstacles are given in terms of tracked vehicle, obstacle, and snow parameters. Tests of two tracked vehicle. obstacle, and snow parameters. Tests of two tracked vehicles on snow covered slopes, stream crossings, steps and trenches were conducted, and some of the results were compared with computed values. Differences between computed and

experimental values are attributed to neglecting alip-sinkage and track deflection in the computations. (Auth.)

REMOTE SENSING OF ACCUMULATED FRA-ZIL AND BRASH ICE.

Dean, A.M., Jr., National Hydrotechnical Conference, Jean, A. M., Jr., National Hydrotechnical Contention, and (with the participation of the Municipal Section), Quebec, May 30-31, 1977. Proceedings, Université Laval, Canadian Society for Civil Engineering, 1977, p.693-704, In English with French summary. 6 refs. 31-3434.

51-34-34 FRAZIL ICE, ICE CONDITIONS, REMOTE SENSING, ICE COVER THICKNESS, IMPACT STRENGTH, AERIAL RECONNAISSANCE, COMPUTER APPLICATIONS, ICE NAVIGA-TION.

The use of a broad-banded impulse radar system for aerial detection of accumulated frazil and brash ice in a 9.5 km reach of the St. Lawrence River is described. The impact of excessive frazil ice accumulation on the extended navigation season and on power generation is discussed. Equipment and technique are evaluated, while the data are presented as a contour map of ice thickness.

AIR PHOTO INTERPRETATION OF A SMALL

DenHartog, S.L., National Hydrotechnical Conference, 3rd (with the participation of the Municipal Section), Quebec, May 30-31, 1977. Proceedings, Université Laval, Canadian Society for Civil Engineering, 1977, p. 705-719, In English with French summary.

ICE JAMS, ICE MECHANICS, PHOTOINTER-PRETATION, VI PHOTOGRAPHS. VELOCITY, SLOPES, AERIAL

PHOTOGRAPHS.

Air photos of a small ice jam on the Pemigewasett River near Plymouth, N.H., were taken three days after the jam and compared with photos taken after the ice went out. The winter photos show a marked and sudden decrease in flow size apparently indicative of faster and longer movement of the ice. The spring photos show a number of shallows and obstructions that apparently had no effect on the ice movement. It is concluded that this jam was caused by a change in slope and subsequent reduction in velocity.

MP 936

NUMERICAL SIMULATION OF AIR BUBBLER

NUMERICAL SIMULATION OF AIR BUBBLER SYSTEMS.
Ashton, G.D., National Hydrotechnical Conference, 3rd (with the participation of the Municipal Section), Quebec, May 30-31, 1977. Proceedings, Université Laval, Canadian Society for Civil Engineering, 1977, p.765-778, In English with French summary. 7 refs. 31-3438

BUBBLING, ICE PREVENTION, ICE CONTROL, HEAT TRANSFER, MECHANICAL ICE PREVENTION, EQUIPMENT, ANALYSIS (MATHEMATICS).

EMATICS).

The use of air bubbler systems to suppress ice formation is a technique which has been applied in a variety of situations and with varying degrees of success. Recently two-dimensional line source bubbler systems were analyzed (Ashton, 1974) in an effort to make available a tool which may be used in the design of a bubbler installation. That analysis was a steady-state evaluation of the melting rate of an ice cover above a bubbler system predicted on the basis of the input variables (depth, air discharge rate, water temperature). In actual operation, however, a bubble "sees" changing conditions such as diurnal and longer-term weather conditions, varying water temperatures, and depletion of the conditions, varying water temperatures, and depletion of the available thermal reserve. The simulation presented herin uses the steady-state analysis developed earlier (Ashton, 1974) uses the steady-state analysis developed earlier (Ashton, 1974) and steps it in time with each new condition determined from the results of the previous time step. In this sense the analysis herein may be considered quasi-steady. Results of the simulation are presented for an example case for a winter in Duluth, Minnesots and illustrate selection of time step size, effect of various strategies of intermittent operation, and variation in width of open water area with changing weather conditions.

REVIEW OF ICE PHYSICS BY P.V. HOBBS. Ackley, S.F., American Geophysical Union. Transactions, June 1977, 58(6), p.341-342. 31-3517

ICE PHYSICS.

LONG DISTANCE HEAT TRANSMISSION WITH STEAM AND HOT WATER.

Aamot, H.W.C., et al, International Total Energy Congress, Copenhagen, Oct. 4-8, 1976. Proceedings, 1976, 39p., 9 refs.

Phetteplace, G. 32-2680

HEAT TRANSMISSION, STEAM, WATER PIPE-LINES, COST ANALYSIS, COMPUTER PRO-GRAMS.

ICE ENGINEERING FACILITY HEATED WITH A CENTRAL HEAT PUMP SYSTEM.

ASTONINAL HEAT PUMP SYSTEM.

ASMOT, H.W.C., et al, Energy Environment Conference, Kansas City, Mar. 27-31, 1977. Proceedings.

Kansas City, Missouri, 1977, 4p.

Sector, P.W.

32-2681 BUILDINGS, HEATING, HEAT RECOVERY, RE-FRIGERATION.

MP 940 SEA ICE THICKNESS PROFILING AND UN-

Kovacs, A., Offshore Technology Conference, 9th Houston, May 2-5, 1977. Proceedings, Vol.3, Houston, Texas, 1977, p.547-550, 3 refs. 32-2682

SEA ICE, ICE COVER THICKNESS, MEASUR-ING INSTRUMENTS, RADAR ECHOES.

ING INSTRUMENTS, RADAR ECHOES.
Results obtained with a unique dual-antenna impulse radar system used to profile first- and multi-year sea ice near Prudhoe Bay, Alaska, are discussed. A description of the radar system is given along with representative field data. From the radar impulse travel times obtained with the use of dual antennas, calculations of thickness, electromagnetic impulse velocity and effective dielectric constant of the ice were made. Ice thicknesses determined by direct measurement and those calculated using the radar impulse travel times were found to be in good agreement. Continuous ice thickness profiles obtained with the radar were analyzed to provide representative cross sections of first-year and multi-year sea ice. These cross sections reveal the undulating bottom surface relief of both ice types. Calculations are presented that indicate a significant amount of oil could be trapped within this bottom relief should the oil be released under the ice from a sea-floor oil-production system.

MP 941

MP 941

IONIC MIGRATION AND WEATHERING IN FROZEN ANTARCTIC SOILS.
Ugolini, F.C., et al, Soil science, June 1973, 115(6), p.461-470, 34 refs.

Anderson, D.M. 28-617

FROZEN GROUND CHEMISTRY, SOIL WATER, SOIL CHEMISTRY, UNFROZEN WATER CONTENT, ION DIFFUSION.

Soils of continental Antarctica are forming in one of the most severe terrestrial environments. Continuously low most severe terrestrial environments. Continuously low temperatures and the scarcity of water in the liquid state result in the development of desert-type soils. In an earlier experiment to determine the degree to which radioactive NaCl36 would migrate from a shallow point source in permarket, movement was observed. To confirm this result, a similar experiment involving Na22Cl has been conducted. Significantly less movement of the Na22 ion was observed. Ionic movement in the unfrozen interfacial films at mineral surfaces in frozen ground is held to be important in chemical weathering in Antarctic and other desert soils.

MP 942

MP 942

MANAGEMENT OF POWER PLANT WASTE

HEAT IN COLD REGIONS.

Aamot, H.W.C., U.S. Army research and development, Sep.-Oct. 1975, 16(5), p.22-24, For a detailed treatment of this topic see 29-2708 (CRREL TR 257). 32-2683

BUILDINGS, HE. COST ANALYSIS. HEATING, HEAT RECOVERY,

MP 943

WORD MODEL OF THE BARROW ECOSYS-Brown, J., et al, Conference on Productivity and Con-

servation in Northern Circumpolar Lands, Edmonton, Alberta, Oct. 15-17, 1969. Proceedings. Edited by W.A. Fuller and P.G. Kevan. Morges, Switzerland, International Union for Conservation of Nature and National Resources, 1970, p.41-43. Pitelka, F.A., Coulombe, H.N.

31-4099
ECOSYSTEMS, TUNDRA VEGETATION, TUNDRA SOILS, GRAZING, TEMPERATURE EFFECTS, MOISTURE FACTORS, ANIMALS, UNITED STATES—ALASKA—BARROW.

MP 944 SYNTHESIS AND MODELING OF THE BAR-

ROW, ALASKA, ECOSYSTEM.
Coulombe, H.N., et al, Conference on Productivity and Conservation in Northern Circumpolar Lands, Edmonton, Alberta, Oct. 15-17, 1969. Proceedings. Edited by W.A. Fuller and P.G. Kevan, Morges, Switzenbed. zerland, International Union for Conservation of Nature and National Resources, 1970, p.44-49, 6 refs.

31-4100 ECOSYSTEMS, TUNDRA VEGETATION, TUN-DRA SOILS, MODELS, ANIMALS, COMPUTER APPLICATIONS, UNITED STATES—ALASKA— BARROW

MP 945 ENVIRONMENTAL SETTING, BARROW,

ALASKA.
Brown, J., Conference on Productivity and Conservation in Northern Circumpolar Lands, Edmonton, Alberts, Oct. 15-17, 1969. Proceedings. Edited by
W.A. Fuller and P.G. Kevan, Morges, Switzerland,
International Union for Conservation of Nature and
National Resources, 1970, p.50-64, 67 refs.

National Resources, 1710, p.2004, 2013
31-4101
ENVIRONMENTS, ARCTIC LANDSCAPES, TUNDRA VEGETATION, TUNDRA SOILS, THERMAL REGIME, PERMAPROST, GEOMORPHOLOGY, SHORELINE MODIFICATION, UNITED STATES—ALASKA—BARROW.

UNITED STATES—ALASKA—BARROW.

The Barrow environment can be characterized as follows:
(1) Situated at the northern extremity of the Arctic Coastal
Plain, it has a climate consisting of long, dry, cold winters
and short, moist, cool summers. The latter is moderated
by the influence of the Arctic Ocean. (2) Vegetation
is meadow-like with an abundance of sedges, grasses, herbs
and a few dwarf shrub species. (3) Soils are predominantly
wet, with an average seasonal thaw of approximately 40
cm. (4) Perennially frozen ground underlies the entire
land surface coastal plain sediments are marine in origin
and mid- to late-Pleistocene in age. (6) The tundra landscape
is characterized by active geomorphic processes such as lake
erosion, polygonal ground formation and frost stirring of
the soil.

MP 946 BIBLIOGRAPHY OF THE BARROW, ALASKA, IRP ECOSYSTEM MODEL

Brown, J., Conference on Productivity and Conservation in Northern Circumpolar Lands, Edmonton, Alberta, Oct. 15-17, 1969. Proceedings. Edited by W.A. Fuller and P.G. Kevan. p. 65-71. 31-4102

BIBLIOGRAPHIES, ECOSYSTEMS, BIOMASS, ARCTIC REGIONS, MODELS, UNITED STATES—ALASKA—BARROW.

CRREL IS DEVELOPING NEW SNOW LOAD CRITERIA FOR THE UNITED STATES.

Tobiasson, W., et al, Eastern Snow Conference. Proceedings, Feb. 1976, 33rd, p.70-72, Extended abstract only. 10 refs. Redfield, R.

31-4210 SNOW LOADS, ROOFS, DESIGN CRITERIA.

EFFECTS OF RADIATION PENETRATION ON SNOWMELT RUNOFF HYDROGRAPHS.

Colbeck, S.C. Eastern Snow Conference. Proceedings, Feb. 1976, 33rd, p.73-82, 10 refs. For this paper in another form see 31-4171.
31-4211
SNOWMELT, RUNOFF, SOLAR RADIATION, WATER FLOW.

Water flow through the unsaturated portion of a snowpack Water flow through the unsaturated portion of a snowpack is calculated using various assumptions about radiation penetration into the snow. The results show that for the purposes of hydrologic forecasting, it is sufficiently accurate to assume that all of the radiation absorption occurs on the surface. The error in the calculation of flow is largest for very shallow snowpacks but this error is reduced by radiation absorption at the base of the snow and by the routing of meltwater through the saturated basal layer.

FATE IN THE GREENLAND ICE SHEET. Herron, M.M., et al, Geochimica et cosmochimica acta, July 1977, 41(7), p.915-920, 22 refs. Langway, C.C., Jr., Weisa, H.V., Cragin, J.H. 1979, 197

ICE SHEETS, CHEMICAL ANALYSIS, METALS,

GREENLAND.

Chemical analyses of surface snow and dated deep ice core samples from Central Greenland suggest that Zn, Pb and sulfate are presently being deposited there at two to three times the natural rates. No recent increases in Cd or Veoncentrations were observed. Pre-1900 ice shows no measurable effect of the activities of man and represents a good natural serosol baseline. High enrichment factors relative to average crustal material were observed for Zn, Pb, Cd and sulfate in all samples indicating a natural source other than continental dust is responsible. A high temperature process or vapor phase origin for these enriched elements, possibly volcanism, seems likely.

MP 950 WINTER MAINTENANCE RESEARCH NEEDS. Minsk, L.D., National Research Council. Transportation Research Board. Highway maintenance research needs; report of a workshop held October 7-10, 1974, Washington, D.C., 1975, p.36-38, FHWA-RD-75-511, PB-247 125.

32-240
WINTER MAINTENANCE, ROAD MAINTENANCE, ICE REMOVAL, ANTIFREEZES, ICE
CONTROL, SOIL POLLUTION.

MP 951 COMPRESSIVE AND SHEAR STRENGTHS OF FRAGMENTED ICE COVERS—A LABORATO-

Cheng, S.T., et al, Iowa. University. Iowa Institute of Hydraulic Research. IIHR report, Aug. 1977, No.206, 82p., ADA-045 246, 7 refs.
Tatinclaux, J.C. 22, 1800.

FLOATING ICE, COMPRESSIVE STRENGTH, SHEAR STRENGTH, AIR TEMPERATURE, WATER TEMPERATURE, ICE STRUCTURE.

MP 952 PROCEEDINGS OF THE SECOND INTERNA-TIONAL SYMPOSIUM ON COLD REGIONS ENGINEERING.

Burdick, J., ed. Fairbanks, University of Alaska, Cold Regions Engineers Professional Association, 1977, 597p., For individual papers see 32-283 through 32-320

Johnson, P., ed.

32-282 MEETINGS, ENGINEERING, LOW TEMPERA-TURE RESEARCH.

MP 953
FREEZE DAMAGE PROTECTION FOR UTILI-

TY LINES.

McFadden, T., International Symposium on Cold Regions Engineering, 2nd, Fairbanks, Aug. 12-14, 1976, Proceedings, Fairbanks, University of Alaska, Cold Regions Engineers Professional Association, 1977, p.12-16, 2 refs. 32-284

WATER PIPES, PIPELINE FREEZING, PIPE-LINE INSULATION, ICE PRESSURE.

LINE INSULATION, ICE PRESSURE.

A method for positioning freeze damage and resultant pipe failures was developed using insulation to position the pressure buildup and subsequent damage area. A pressure relief device fabricated largely from common pipe components was designed and tested. Results show that a significant portion of the failures can be eliminated. Experiments into the mechanism involved in pipe freezing has shown that some of the old concepts are incorrect and new insight into the actual freezing process has resulted.

MP 954

MF 95-9 USE OF A LIGHT-COLORED SURFACE TO REDUCE SEASONAL THAW PENETRATION BENEATH EMBANEMENTS ON PERMA-FROST.

FMUSI.

Berg, R.L., et al, International Symposium on Cold Regions Engineering, 2nd, Pairbanks, Aug. 12-14, 1976, Proceedings, Fairbanks, University of Alaska, Cold Regions Engineers Professional Association, 1977, p.86-99, 9 refs.

Quinn, W.F. 32-384

32-289

PERMAFROST CONTROL, EMBANKMENTS, THAW DEPTH, SURFACE STRUCTURE, SOLAR RADIATION, ABSORPTI TITY.

RADIATION, ABSORPTT TTY.

The construction of embankments on permafrost, particularly in regions where the mean ground temperature is close to the melting point, usually results in melting of the permafrost which may cause excessive settlement. The depth of melting (thaw penetration) is considerably increased should the surface of the embankment be covered with a bituminous pavement. This increased melting results from greater absorption of solar radiation by the dark surface. A light-colored surface (white traffic paint) has been used on the asphalt runway at Thule AB, Greenland (a cold permafrost site) and on highway test sections near Fairbanka, Alaska (a warm permafrost site). The selection of light-colored surfacing materials for embankments on permafrost can have a considerable benign influence on the depth of thaw penetration and ultimately thaw consolidation.

MP 955 PERMAFROST EXCAVATING ATTACHMENT FOR HEAVY BULLDOZERS.

Garfield, D.E., et al, International Symposium on Cold Carneso, D.E., et al, International Symposium on Cold Regions Engineering, 2nd, Fairbanks, Aug. 12-14, 1976, Proceedings, Fairbanks, University of Alaska, Cold Regions Engineers Professional Association, 1977, p.144-151, 5 refs.

Mellor, M. 32-292

32-292 EXCAVATION, FROZEN GRAVEL, FROZEN CROUND STRENGTH.

CROUND STRENGTH.

In anticipation of military needs for grading and excavating frozen ground, an attachment for heavy engineer tractors was developed. The attachment consists of a hydraulically driven horizontal cutter drum that attaches to buildozer push arms, together with an auxiliary power source that attaches to the rear of the tractor. The machine is intended to break up frozen soils on that it can be handled by conventional earthmoving equipment. Tests in frozen gravel and in rock outcrops demonstrated that the machine and its cutting picks could withstand the most severe cutting conditions that would normally be met. In frozen gravel, cutting rates at a drum operating depth of 1.0 ft (0.3 m) averaged 1.5 ft/min (7.6 mm/s) at a 30-rev/min drum speed and 1.7 ft/min (8.6 mm/s) at 15 rev/min. Operating at the same depth in frozen silt, cutting rates averaged 1.8 ft/min (9.1 mm/s) at both 30-rev/min and 15-rev/min drum speeds; however, cutting rates varied considerably at the lower drum (2.1 mm/s) at one 30-120-110m and 12-120-110m unit specus;
speed. Modifications suggested for future designs include changes in the tooth lacing pattern and changes in the method of attaching the drum to the tractor.

MP 956 ICE ROG SUPPRESSION LISTNG MONOMOLECULAR FILMS.

McFadden, T., International Symposium on Cold Re-McGadden, T., International Symposium on Cold Regions Engineering, 2nd, Fairbanks, Aug. 12-14, 1976, Proceedings, Pairbanks, University of Alaska, Cold Regions Engineers Professional Association, 1977, p.361-367, 6 refs. 32-306

ICE FOG. COUNTERMEASURES, FILMS, CHEMICAL PROCESSIONAL SYMPOSIUM PROFESSIONAL PROFESSION

CHEMICAL REACTIONS.

CHEMICAL REACTIONS.

Experiments in ice fog suppression using the evaporation reduction abilities of several chemical films are discussed. Advantages and disadvantages of different films are considered and techniques for minimizing some of the disadvantages are described. Fog reduction, both ice fog and cold vapor fog, can be achieved very economically using these films. Up to 85% of the fog normally generated can be suppressed; however, the remaining 15% cannot be eliminated by this technique.

MEASURING UNMETERED STRAM USE WITH A CONDENSATE PUMP CYCLE COUN-

Johnson, P.R., International Symposium on Cold Regions Engineering, 2nd, Fairbanks, Aug. 12-14, 1976, Proceedings, Fairbanks, University of Alaska, Cold Regions Engineers Professional Association, 1977, p.434-442, 2 refs. 32-313

BUILDINGS, HEAT LOSS, STEAM, PUMPS, MEASUREMENT.

MEASUREMENT.

The steam heat used in a combination dormitory and office building at Eielson AFB, Alaska, was measured over a 303-day period using a counter on the condensate return pump. The general relationships between pump cycle frequency and condensate flow were derived. This information was used to calibrate the system and express condensate flow and heat use with the number of pump cycles per hour. The heat used by the building consisted of a constant load for water heating and heat loss within the building and a variable load for space heating. The variable space-heating load was strongly controlled by the outside sir temperature and apparently consists of two temperature-dependent heat loss mechanisms. The first is conduction through the walls. It is speculated that the second is open-window air exchange for ventilation and to control room temperatures. The condensate pump cycle counter proved to be an inexpensive means of measuring steam use suitable for engineering and energy conservation studies. Further studies of actual heat consumption by various types of buildings in Alaska are recommended.

MP 958

MP 958 REINSULATING OLD WOOD FRAME BUILD-INGS WITH UREA-FORMALDEHYDE FOAM.

Tobiasson, W., et al, International Symposium on Cold a vocasson, w., et at, international Symposium on Cold Regions Engineering, 2nd, Pairbanks, Aug. 12-14, 1976, Proceedings, Fairbanks, University of Alaska, Cold Regions Engineers Professional Association, 1977, p.478-487, 6 refs.

Flanders, S.N.

32-314
BUILDINGS, WALLS, THERMAL INSULATION,
HEAT LOSS, CELLULAR PLASTICS.

Urea-formaldehyde (UF) foam was investigated for use as an insulation retrofit material in very cold regions. A test installation of the material was made in stud frame walls at Fort Greely, Alaska in August 1975. Two months

later, a nondestructive survey of these walls employing thermopiles, thermocouples and an infrared camera revealed a marked improvement in the wall's insulating performance. Cuss in test areas eight months later revealed excellent filling and showed shrinkage to be under 2%. The implications of these and other findings for the suitability of foam as an insulation retrofit material are discussed. We are cautiously optimistic that UF foam has good potential for use in very cold resions. tiously optimistic that in very cold regions.

MP 959 SOME ECONOMIC BENEFITS OF ICE

Perham, R.E., International Symposium on Cold Regions Engineering, 2nd, Fairbanka, Aug. 12-14, 1976, Proceedings, Fairbanka, University of Alaska, Cold Regions Engineers Professional Association, 1977, p.570-591, 29 refs. 32-319

ICB BOOMS, ICB CONTROL, RIVER ICE, LOADS (FORCES), COST ANALYSIS, ECONOM-

LOADS (FORCES), COST ANALYSIS, ECONOMICS.

In early winter, ice booms are used to assist nature in quickly forming a solid ice cover on rivers. The open water, insulated in this way, is no longer the source of frazil ice which, in the past, has caused ice jams, flooding, and the loss of electrical generating capacity. They function in other ways as well such as strengthening the ice sheet edge against subsequent damage and restraining its movement. Ice booms are basically lines of floating timbers or poutoons held in place by heavy cable structures connected to buried anchors. They were developed and are used mainly by hydroelectric power groups but they also help facilitate ahip navigation in winter. The cost of these ice control devices over the past 17 years has ranged from about \$48/ft (\$156/m) to \$333/ft (\$1034/m) with one set costing approximately \$1,500,000. The value of many ice booms can best be related to the cost of replacing the electric power that could be lost if they were not present, as opposed to trying to choose a cost basis for a flood. A rough estimate of \$0.01/kWh for the value of replacement power is used here. The most valuable ice boom could be the Lake Rite Ice boom which saves an estimated \$13,000,000 per year. Next are the ice booms on the Beauharnois Canal which are used with particular operating techniques to save approximately \$4,300.000 per year. Ice boores can also help as we rillions. used with particular operating techniques to save approximately \$4,300,000 per year. Ice booms can also help save millions in shipping costs as well by stopping excessive ice movements during the navigation season in winter on the Great Lakes.

MP 960

YUKON RIVER BREAKUP 1976.

Johnson, P., et al, International Symposium on Cold Regions Engineering, 2nd, Pairbanks, Aug. 12-14, 1976, Proceedings, Fairbanks, University of Alaska, Cold Regions Engineers Professional Association, 1977, p.592-596, 8 refs.
Burdick, J., Esch, D., McFadden, T., Osterkamp, T.E.,

Zarling, J. 32-320

RIVER ICE, ICE BREAKUP, ICE LOADS, OFF-SHORE STRUCTURES.

SHORE STRUCTURES.

A recently completed bridge across the Yukon River, north of Fairbanks, Alaska, provides an opportunity for studying breakup processes and measuring ice forces on a structure in a major river where ice conditions are near the continental extreme. Above the bridge the river flows through the 200-mile long Yukon Flats, a marshy, lake-dotted area. The multiple channels of the river meander back and forth providing a very large water surface for winter ice production. The winters are long and severely cold with only light snowfall so the Flats produce very large quantities of thick ice which pass through the bridge each spring. The bridge is a six-span continuous orthotropic-deck structure spanning a 2,000-foot channel. Five reinforced concrete piers secured to bedrock with prestressed rock anchors are subject to 2,000-foot channel. Five reinforced concrete piers secured to bedrock with prestreased rock anchors are subject to river ice. Steel legs rise from the tops of the piers to carry the deck. USACRREL, University of Alsaka, and Alsaka Department of Highways personnel observed ice-bridge interactions during the 1976 breakup. Time lapse and regular speed Super 8 movie and 35mm still photographs were taken. Several types of ice failure were observed including crushing along the full width of the piers, splitting, combined splitting and crushing and non-failure.

MP 961 INFRARED DETECTIVE: THERMOGRAMS AND ROOF MOISTURE

Korhonen, C., et al, ASHRAE journal, Sep. 1977, 19(9), p.41-44.
Tobiasson, W., Dudley, T.

32-508

INFRARED EQUIPMENT, ROOPS, MOISTURE, INSULATION.

INSULATION.

Four building roofs at Pease AFB were surveyed with a hand-held infrared camers to detect wet insulation. Areas of wet insulation on these roofs were marked with pray paint, and 3-in-dia core samples of the built-up membrane and insulation were taken to verify wet and dry conditions. Plashing defects are considered responsible for most of the wet insulation uncovered in this survey. Recommendations for maintenance, repair, and replacement were developed from the infrared surveys, core samples and visual examinations.

REPETITIVE LOADING TESTS ON MEM-BRANE ENVELOPED ROAD SECTIONS DUR-ING FREEZE THAW.

Smith, N., et al, Preprints of papers presented at a specialty session of the ASCE Fall Convention and Exhibit, San Francisco, California, Oct. 17-21, 1977, American Society of Civil Engineers, 1977, p.171-197,

Eaton, R.A., Stubstad, J. 32-562

FREEZE THAW TESTS, ROADS, SUBGRADE PREPARATION, PROTECTIVE COATINGS, SOIL AGGREGATES, SOIL STRENGTH, DYNAMIC LOADS.

MP 963

DYNAMIC IN-SITU PROPERTIES TEST IN FINE-GRAINED PERMAFROST.

Blouin, S.E., Preprints of papers presented at a special-ty seasion of the ASCE Fall Convention and Exhibit, San Francisco, California, Oct. 17-21, 1977, American Society of Civil Engineers, 1977, p.282-313, 19 refs.

PERMAPROST PHYSICS, EXPLOSION EF-FECTS. BLASTING.

MP 964 CASE FOR COMPARISON AND STANDARDIZATION OF CARBON DIOXIDE REFERENCE

Exchange Methodology, Terrestrial Primary Productivity, Oak Ridge National Laboratory, 1973. Proceedings, 1973, p.163-181, 18 refs.

Coyne, P.I. 32-675

CAPPONI

CARBON DIOXIDE, ENVIRONMENTS, PHOTO-SYNTHESIS. MEASURING INSTRUMENTS. SYNTHESIS. TUNDRA BIOME, SPECTROMETERS.

TUNDRA BIOME, SPECTROMETERS.

Infrared gas analytical techniques have made it possible to detect small amounts and changes in carbon dioxide in the environment.

The reliability and intercomparison of these measurements depends on the ability to calibrate the IRGA with a high degree of precision and accuracy. A mutual comparison scheme is presented to provide a method for calibrating an infrared gas analyzer and to document changes that occur in CO2 reference gas standards. It is suggested that a need exists to establish a central reference gas laboratory for the purpose of supply investigators with accurate reference gas standards. (Auth.)

WASTEWATER TREATMENT IN COLD RE-GIONS.

Sletten, R.S., et al, U.S. Army Cold Regions Research and Engineering Laboratory, 1976, 15p., ADA-026 156, Unpublished report.

Uiga, A. 32-1274 WASTE TREATMENT, WATER TREATMENT, MILITARY FACILITIES.

MILITARY FACILITIES.

Westewater treatment at remote military installations in Alaska presently consists of aerated lagoons and extended aeration package plants. Although performance data for these systems are either very limited or in most cases nonexistent, indications are that most of these systems can not meet secondary effluent criteria as defined by the EPA. Processes for upgrading to meet the new criteria must be as simple as possible to design, build and operate. In particular, the requirements for operation and maintenance should be minimal due to the remote, isolated nature of most of the camps. Processes which appear to be feasible include land application, intermittent filtration, and variations of ponding.

MP 966

PASSAGE OF ICE AT HYDRAULIC STRUC-

Calkina, D.J., et al. Annual Symposium of the Waterways, Harbors and Coastal Engineering Division of ASCE, 3rd, Fort Collins, Colorado, Aug. 10-12, 1976. Proceedings, New York, American Society of Civil Engineers, 1976, p.1726-1736, 32 refs. Ashton, G.D.

HYDRAULIC STRUCTURES, ICE LOADS, ICE MECHANICS, ICE BOOMS, ICE STRENGTH, RIVER ICE, ICE CONTROL.

The passage of ice through hydraulic structures is an important consideration in the construction of such works in the northern areas. The performance of various structures in passing ice has been documented mainly in descriptive terms; however, ice has been documented mainly in descriptive terms; however, some physical measurements have been made on the volumetric for discharge through such openings. By expressing the ice discharge as a surface concentration, meaningful site comparisons can be made. Physical model studies on various aspects of ice related problems in rivers and at their structures have been increasing within the last five years. One major problem area is the assessment and influence of the strength of ice, which applies to both the field and laborators studies

EFFECT OF SEDIMENT ORGANIC MATTER ON MIGRATION OF VARIOUS CHEMICAL CONSTITUENTS DURING DISPOSAL OF DREDGED MATERIAL

Blom, B.E., et al, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. Contractor report, May 1976, WES-CR-D-76-7, 183p., ADA-027

Jenkins, T.F., Leggett, D.C., Murrmann, R.P. 32-850

SEDIMENT TRANSPORT, WASTE DISPOSAL, WATER POLLUTION, WATER CHEMISTRY, DRED JING.

MP 968

WASTEWATER TREATMENT ALTERNATIVE NEEDED.

Natural Natura

WASTE TREATMENT, WATER TREATMENT, SEEPAGE SEWAGE TREATMENT.

ICE DECAY PATTERNS ON A LAKE, A RIVER AND COASTAL BAY IN CANADA.

Bilello, M.A., Canadian Association of Geographers. Programme and abstracts of the CAG Conference, 1977, University of Regina, 1977, p.120-127, 4 refs. 32-929

ICE COVER THICKNESS, ICE BREAKUP, ICE DETERIORATION, LAKE ICE, RIVER ICE, SEA

THE INFLUENCE OF GRAZING ON RATE THE ARCTIC TUNDRA ECOSYSTEMS. Batzli, G.O., et al, Arctic bulletin, 1976, 2(9), p.153-

Brown, J. 31-394

RESEARCH PROJECTS, TUNDRA VEGETA-TION, ECOSYSTEMS, ANIMALS, GRAZING, PLANTS (BOTANY), TUNDRA SOILS.

MP 971 COMPUTER MODELING OF TERRAIN MODIFICATIONS IN THE ARCTIC AND SU-BARCTIC.

Outcait, S.I., et al, Symposium: Geography of polar countries. XXIII International Geographical Congress, Leningrad, USSR, 22-26 July 1976, edited by J. gress, Leningrad, USSR, 22-20 July 1976, edited by J.
Brown. Selected papers and summaries. CRREL
SR 77-6, Hanover, New Hampahire, U.S. Army Cold
Regions Research and Engineering Laboratory, 1977,
p.24-32, ADA-038 379, In English with Russian summary. 41 refs. Brown, J.

32-1305

TERRAIN IDENTIFICATION, COMPUTERIZED SIMULATION, MODELS, VEGETATION, PERMAFROST STRUCTURE, HUMAN FACTORS.

MP 972 LOCK WALL DEICING.

Hanamoto, B., Lock wall deicing studies, edited by B. Hanamoto. CRREL SR 77-22, Hanover, New Hampshire, Cold Regions Research and Engineering Laboratory, 1977, p.7-14, ADA-044 943. 32-1350

ICE REMOVAL, ICE PREVENTION, INFLATA-BLE STRUCTURES, PROTECTIVE COATINGS, LOCKS (WATERWAYS).

MP 973 LOCK WALL DEICING WITH HIGH VELOCITY

WATER JET AT SOO LOCKS, MI.
Calkins, D.J., et al, Lock wall deicing studies, edited by B. Hanamoto. CRREL SR 77-22, Hanover, New Hampshire, Cold Regions Research and Engineering Laboratory, 1977, p.23-35, ADA-044 943, 2 refs. Mellor, M., Ueda, H.T.

32-1351 ICE REMOVAL, WATER EROSION, HIGH PRESSURE TESTS, LOCKS (WATERWAYS). LABORATORY EXPERIMENTS ON LOCK WALL DEICING USING PNEUMATIC DE-

B. Hanamoto. CRREL SR 77-22, Hanover, New Hampshire, Cold Regions Research and Engineering Laboratory, 1977, p.53-68, ADA-044 943, 1 ref. Frank, M., Ackley, S.F. 32-1352

ICE REMOVAL, INFLATABLE STRUCTURES, LABORATORY TECHNIQUES, LOCKS (WA-TERWAYS).

MP 975

MP 975
LAND APPLICATION OF WASTEWATER: FORAGE GROWTH AND UTILIZATION OF APPLIED NITROGEN, PHOSPHORUS AND
POTASSIUM.

PULANSIUM.
Palazzo, A.J., Corneil Agricultural Waste Management Conference, Ithaca, N.Y., 1976. Proceedings.
Land as a waste management alternative. Edited by R.C. Loehr, Ann Arbor, Mich., Ann Arbor Science, 1977, p.171-180, 8 refs.
32-1526

WASTE DISPOSAL, SOIL CHEMISTRY, WATER CHEMISTRY, LAND DEVELOPMENT, PLANTS (BOTANY), GRASSES, GROWTH.

(BOTANY), GRASSES, GROWTH.

Data have been presented on the growth and chemical composition of forages when influenced by various application rates of wastewater during 1974 and 1975. The results above that the greatest average annual forage yields and N and P removal occurred at the highest application rate of 5 cm/wk). However, forage removal efficiency of applied N and P was greatest at the lowest application rate of 5 cm/wk. At this rate an average of 97 percent of the applied N and 35 percent of the applied P was contained in the forage. Analyses performed in 1974 and 1975 ahowed a reduction in the levels of K in the soil and forage in 1975, relative to 1974, which indicates a requirement for K fertilization for sustained productivity. The reduction in K was related to the large quantities of this element required by crops and its low concentration in the wastewater. Soil analyses also showed reductions in soil pH and total exchangeable cations to levels which could be corrected by liming.

MP 976 PRELIMINARY EVALUATION OF 88 YEARS RAPID INFILTRATION OF RAW MUNICIPAL SEWAGE AT CALUMET, MICHIGAN.

Baillod, C.R., et al, Cornell Agricultural Waste Management Conference, Ithaca, N.Y., 1976. Proceedings. Land as a waste management alternative. Edited by R.C. Loehr, Ann Arbor, Mich., Ann Arbor Science, 1977, p.489-510, 16 refs.
Waters, R.G., lakandar, I.K., Uiga, A.

WASTE DISPOSAL, WATER TREATMENT, LAND DEVELOPMENT, SEEPAGE, SEWAGE DISPOSAL, WATER CHEMISTRY.

MP 977

URBAN WASTE AS A SOURCE OF HEAVY MET-ALS IN LAND TREATMENT.

Metals in the Environment, Toronto, Ont., Canada, Oct. 27-31, 1975. Proceedings, Toronto, Canada, (1976), p.417-432, In English with French summary. 36 refs. mary. 32-1528

WASTE DISPOSAL, SOIL CHEMISTRY, MICRO-ELEMENT CONTENT, PLANTS (BOTANY), LAND DEVELOPMENT, SOIL POLLUTION, GRASSES, METALS.

GRASSES, METALS.

Heavy metal accumulation in soils and forages of a slow infiltration prototype land treatment system over a two year period is discussed. Uptake of heavy metals by plants and soils varied according to the amounts applied, soil type, and mode of wastewater application. Charlton silt loam soil retained more heavy metals than Windsor sandy loam. Heavy metals were confined to the top 15 cm of the soil and vertical movement occurred only in the soil from the treatment receiving the highest application rate (15 cm/wk). Movement of heavy metals in this treatment was thought to be due to a redistribution of organic matter (hydraulic effect), a decrease in soil pH or both. Forages (quack grass) from all the treatments contained much higher conceneffect), a decrease in soil pH or both. Forages (quack grass) from all the treatments contained much higher concentrations of heavy metals than the control. There were significant differences in plant tissue heavy metal accumulation between the different cuts. This was related to the concentration of heavy metals in the applied effluent. Forages from the second cut contained Cd and Ni and to some extent Cu at "toxic" levels, while Zn, Cr, Hg and Pb were present in normal or slightly higher amounts. Spray irrigation of heavy metal-spiked wastewater resulted in much higher concentrations in the plant tissue than in those from flood irrigation treatments. This could be due to absorption of heavy metals by the leaves in the sprayed forages. MP 978

MP 978
FREEZE-THAW ENHANCEMENT OF THE
DRAINAGE AND CONSOLIDATION OF FINEGRAINED DREDGED MATERIAL IN CONFINED DISPOSAL AREAS.
Chamberlain, E.J., U.S. Army Engineer Waterways
Experiment Station, Vicksburg, Mississippi. Technical report, Oct. 1977, TR-D-77-16, 94p., ADA-046

400.

32-1515

WASTE DISPOSAL, DREDGING, SOIL COM-PACTION, SOIL FREEZING, FREEZE THAW CYCLES, PERMEABILITY.

CYCLES, PERMEABILITY.
Fine-grained dredged material obtained from disposal sites in the Great Lakes region was subjected to controlled freeze-thaw cycling in a special laboratory consolidometer. Volume changes and permeabilities were observed after full consolidation and freeze-thaw cycling for applied pressures in the range of 0.93 to 30.73 kPs. It was observed that as much as 20 percent or more volume reduction results when much as 20 percent or more volume reduction results when fredged material with liquid limits in the range of 60 to 90 percent is subjected to one cycle of freezing and thawing. The degree of overconsolidation by freezing and thawing appears to decrease with increasing amounts of coarse materials and with increasing plasticity. The vertical permeability of all materials examined was increased as much as two orders of magnitude, the greatest increase in permeability occurring for the fine-grained materials at the lowest stress levels.

MP 979 WASTEWATER REUSE AT LIVERMORE, CALI-FORNIA.

Uiga, A., et al, Cornell Agricultural Waste Management Conference, Ithaca, N.Y., 1976. Proceedings. Land as a waste management alternative. Edited by R.C. Loehr, Ann Arbor, Mich., Ann Arbor Science 1977, p.511-531, 24 refs. Iskandar, I.K., McKim, H.L.

32-1529

WASTE TREATMENT, WATER TREATMENT, WATER CHEMISTRY.

WATER CHEMISTRY.

Wastewater reuse occurs at Livermore, California by application of treated effluent to a golf course, to a farminand to an airport area and to a stream. Salinity problems occurred on the clay soils of the golf course because requirements for daily site soccess and wastewater application were contradictory. The effluent was successfully reused at the agriculture site and disposal area. The outfall discharge increased the total dissolved solids of the receiving water and discharged large quantities of chlorine. Soil chemical and discharged large quantities of chlorine. Soil chemical analysis showed that exchangeable sodium percentage, total phosphorus, soluble phosphorus, pH, and organic carbon were changed but not critically by effluent reuse. The changes, except in pH, could be explained by existing agronomic techniques for irrigation in a semi-arid climate.

DETERMINATION OF 2,4,6-TRINITROTOL-UENE IN WATER BY CONVERSION TO NI-

Leggett, D.C., Analytical chemistry, 1977, Vol.49, p.880, 5 refs. 32-1530

WATER TREATMENT, WATER CHEMISTRY, WASTE DISPOSAL, WASTE TREATMENT.

MP 981 WATER VAPOR ADSORPTION BY SODIUM MONTMORILLONITE AT -5C.

Anderson, D.M., et al, Icarus, 1978, Vol.34, p.638-644. 8 refs

Schwarz, M.J., Tice, A.R.

WATER VAPOR, ADSORPTION, LOW TEMPER-ATURE TESTS, CLAY MINERALS, MARS (PLA-NET).

A large amount of interest has recently been expressed pertaining to the quantity of physically adsorbed water by the Martian regolith. Thermodynamic calculations based on experimentally determined adsorption and desorption isotherms and extrapolated to subzero temperatures indicate therms and extrapolated to subzero temperatures indicate that physical adsorption of more than one or two monomolecular layers is highly unlikely under Martian conditions. Any additional water would find ice to be the state of lowest energy and therefore the most stable form. To test the validity of the thermodynamic calculations, we have measured adsorption and desorption isotherms of sodium montmorillonite at -5C. To a first approximation it was found to be valid.

MP 982

ROOF LOADS RESULTING FROM RAIN ON SNOW; RESULTS OF A PHYSICAL MODEL. Colbeck, S.C., Canadian journal of civil engineering, Dec. 1977, 4(4), p.482-490, In English with French summary. 11 refs. See also 32-1151 (CR 77-12). 32.1649

32-1648
ROOPS, SNOW LOADS, RAIN, MATHEMATI-CAL MODELS.

A physical model is used to calculate roof loads due to rain on a snow covered roof. A snow depth of 0.5

m and the twenty-five year rainstorm in Hanover, New Hampshire, are used in the examples. For a flat roof with 10 m parallel flow to gutters, the total liquid weight can increase the roof load by about 50%. The weight of the transient liquid is greatly increased in the mode of flow is radial to contral drains and is decreased if the roof is slightly inclined or if significant melt channels form in the basal layer. However, the wetting of the anow over its entire depth will still cause a significant weight of transient liquid. Snow drifting can cause very large, local loads but the effects of snow temperature and antecedent moisture are not too important. Depending on the circumstances, the largest load can occur for either a long duration, low intensity rainstorm or a short duration, high intensity rainstorm. The former occurs if the saturated layer makes a significant contribution to the total live load whereas the latter occurs when the liquid weight is due mainly to the unsaturated layer. Purther study is needed to establish the joint probabilities of combined snow and rain loads, especially when rain and snowmelt occur simultaneously.

MTP 983

MP 983

EXAMINATION OF THE VISCOUS WIND-DRIVEN CIRCULATION OF THE ARCTIC ICE COVER OVER A TWO YEAR PERIOD. Hibler, W.D., III, et al, Arctic loe Dynamics Joint Experiment. AIDJEX bulletin, Sep. 1977, No.37, p.95-133, 27 refs.

Tucker, W.B. 32-1696

SEA ICE, WIND FACTORS, VISCOUS FLOW, MATHEMATICAL MODELS, BOUNDARY VALUE PROBLEMS.

values reconstruction of the viscous approach is made by comparing predicted with observed ice drift in the Arctic basin over a two-year period employing a viscous constitutive law having both bulk and shear viscosities. Numerical drift calculations for the Arctic Basin are carried out at 4-day intervals over a two-year period employing periodic boundary conditions. Drift predictions are compared with the observed drift of three contemporaneous drifting stations with resonable agreement. The largest errors are found the observed drift of three contemporaneous drifting stations with reasonable agreement. The largest errors are found to occur in late summer, and may be due to nonsteady current effects. Boundary value calculations show that reduction of the shear viscosity (while still maintaining a large bulk viscosity) reduces the excessive stiffening often found in viscous models while still maintaining substantial changes in drift direction due to boundaries. Sensitivity studies show steady current effects to be small for drift rates over tens of days but not negligible for cumulative drift over years. drift over years

MP 984 ANALYSIS OF ENVIRONMENTAL FACTORS AFFECTING ARMY OPERATIONS IN THE ARCTIC BASIN.

Sater, J.E., ed, Montreal, Quebec, Feb. 1962, 11p., For a more extensive report see SIP 21843. Arctic Institute of North America.

32-1902

ENVIRONMENTS, MILITARY OPERATION, RESEARCH PROJECTS, MILITARY RESEARCH, ARCTIC REGIONS.

ARCTIC TRANSPORTATION: OPERATIONAL AND ENVIRONMENTAL EVALUATION OF AN AIR CUSHION VEHICLE IN NORTHERN ALASKA.

Abele, G., et al, Journal of pressure vessel technology, Feb. 1977, 99(1), p.176-182, 8 refs.

Brown, J.

32-1801
AIR CUSHION VEHICLES, TRANSPORTATION,
TRAFFICABILITY, ARCTIC LANADSCAPES,
ENVIRONMENTS, ENVIRONMENTAL IMPACT, TUNDRA VEGETATION, DAMAGE.

SEA ICE ENGINEERING.

Assur, A., International Conference on Port and Ocean Engineering Under Arctic Conditions, 3rd, Fairbanks, Aug. 11-15, 1975, Vol.1, University of Alaska, 1976, p.231-234, Extended summary only. 32-221

SEA ICE, ICE MECHANICS, ENGINEERING.

ISLANDS OF GROUNDED SEA ICE.

Dehn, W.F., et al. Environmental assessment of the Alaskan continental shelf; Vol. 14, Ice. Principal Investigators' reports for the year ending March 1976, Boulder, Colorado, Environmental Research Laboratories, 1976, p.35-50, 28 refs. Preprint from 1975 POAC Conference. Gow, A.J.

31-629

ICE ISLANDS, REMOTE SENSING, SPACE-BORNE PHOTOGRAPHY, BATHYMETRY.

Large areas of grounded sea ice have been reported by early arctic explorers and more recently by the U.S. Coast Guard. The ESSA, ERTS, NOAA, and DMSP satellites now provide multi-spectral imagery with sufficiently high

resolution to allow detailed sequential observations to be made of the movement and spatial extent of arctic sea ice. This report discusses the location, formation, and decay of five large (>30 as km) islands of grounded sea ice in the southern Chukchi Sea as observed for an extended period of time using satellite imagery. Measurements of the bathymetry around one grounded sea ice feature are presented along with observations made and photos taken from the ice surface. The potential use of these sea ice islands as research stations is also discussed.

IMPACT OF SPHERES ON ICE. CLOSURE. IMPACT OF SPHERES ON ICE. CLOSURE. Yen, Y.-C., et al, American Society of Civil Engineers. Engineering Mechanics Division. Journal, April 1972, 98(EM2), p.473, For original article and prior discussion see 25-2241 and 26-0978 respectively. Odar, F., Bracy, L.R. 26-3743

ICE MECHANICS, IMPACT STRENGTH.

PROGRESS REPORT ON 25 CM RADAR OB-SERVATIONS OF THE 1971 AIDJEX STUDIES. Thompson, T.W., et al, Arctic Ice Dynamics Joint Experiment. AIDJEX bulletin, Feb. 1972, No.12, p.1-

Bishop, R.J., Brown, W.E. 27-507

RADAR PHOTOGRAPHY, ICE FLOES.

MP 990

USE OF INSTRUMENTATION UNDER ARCTIC CONDITIONS.

Atkins, R.T., Arctic Logistics Support Technology. Proceedings of a symposium held at Hershey, Pennsylvania, Nov. 1, 1971, Arctic Institute of North America, 1972, p.183-188, AD-744 669.

INSTRUMENTS.

ARCTIC AND SUBARCTIC ENVIRONMENTAL ANALYSES UTILIZING ERTS-1 IMAGERY; BI-MONTHLY PROGRESS REPORT, 23 JUNE - 23 AUG. 1972.

Anderson, D.M., et al, U.S. National Aeronautics and Space Administration. Contractor report, Aug. 23, 1972, NASA-CR-128095, 3p., N72-31361. Haugen, R.K., Gatto, L.W., Slaughter, C.W., Marlar,

REMOTE SENSING, ARCTIC ENVIRONMENT,

SPACECRAFT.

MP 992

SURFACE-WAVE DISPERSION IN BYRD

LAND, ANTARCTICA.
Acharya, H.K., Seismological Society of America.
Bulletin, Aug. 1972, 62(4), p.955-959, 12 refs. 27-1490

ICE SHEETS, WAVE PROPAGATION, SNOW ACOUSTICS, SEISMIC VELOCITY, ANTARCTICA—MARIE BYRD LAND.

Assuming constant density and Poisson's ratio of 0.25, theoreti-Assuming constant density and Poisson's ratio of U.23, theoren-cal surface-wave dispersion has been computed for the Byrd Land area in Antarctica, where the velocity increases monotonically with depth. Con.pu.son with observed dis-persion indicates 8 to 10 per cent anisotropy in the ice cap. Such anisotropy was also detected from ultrasonic velocity measurements on snow cores. (Auth.)

MP 993

SMALL-SCALE STRAIN MEASUREMENTS ON A GLACIER SURFACE.

Colbeck, S.C., et al., Journal of glaciology, July 1971, 10(59), p.237-243, Also published as Washington (State) University. Department of Atmospheric Sciences. Technical report TR-12, Nov. 25, 1970. In English with French and German summaries. 10

Evans, R.J. 27-1704

GLACIER FLOW, CREVASSES, ICE DEFORMA-TION, STRAIN MEASUREMENT.

Surface deformations in the neighborhood of a crevasse field were measured over short (3 m) gage lengths in order to study flow conditions associated with crevasse formation. study flow conditions associated with crevasse formation. The results obtained were unusual in that they were inconsistent with large-scale results found by previous workers. It was concluded that the presence of small-scale surface effects, such as fractures, pot-holes and healed crevasses give rise to small-scale deformation fields with large spatial and temporal variations and that there is a lower limit of gage length below which deformation measurements pertinent to regional flow phenomena cannot be made. This lower limit to apparently an order of magnitude greater than the spacing of the features which give rise to localized effects.

MARIE BYRD LAND QUATERNARY VOLCAN-ISM: BYRD ICE CORE CORRELATIONS AND

POSSIBLE CLIMATIC INFLUENCES.
LeMasurier, W.E., Antarctic journal of the United States, Sept.-Oct. 1972, 7(5), p.139-141, 4 refs.

ICE CORES, DRILL CORE ANALYSIS, VOLCAN-IC ASH, ANTARCTICA—MARIE BYRD LAND. IC ASH, ANTARCTICA—MARIE BYRD LAND. Published petrographic descriptions of the volcanic sah bands in the Byrd Station deep drill core (Gow, 1971; E-10325, and Gow and Williamson, 1971; E-10462) have suggested some sources for sah among the volcanoes in Byrd Land and some possible climatic implications of this volcanism. The available petrographic and age data on volcanoes that are known to have crupted in Byrd Land in Quaternary time - Mt. Murphy, Toney Mountain, Mt. Takahe, and Mt. Wasche - suggest that Mt. Wasche and Mt. Takahe were the major sources of sah. Events recorded in the core occurred within the last 75,000 yr. The most distinctive petrographic characteristics of the Quaternary volcanic rocks are the abundance of olivine, plagicelase, and titansugite phenocrysts in the busslts, and of alkali feldspar and aegerine phenocrysts in the acid rocks.

MP 995 SUMMARY OF THE 1971 US TUNDRA BIOME PROGRAM.

Brown, J., International Biological Programme, Tundra biome; Proceedings IV. International Meeting on the Biological Productivity of Tundra, Leningrad USSR, October 1971. Edited by F.E. Wielgolaski and Th. Rosswall. Stockholm, Tundra Biome Steering Committee, April 1972, p.306-313.

RESEARCH PROJECTS, TUNDRA BIOME, UNITED STATES—ALASKA.

DNITED STATES—ALASKA.

Briefly outlined are the U.S. Tundra Biome studies including the interrelationships between tundra fauna and flora, photosynthesis, carbon dioxide budget, wet tundra soil science, and lake and pond eccepstems. Activities were centered primarily on the Barrow, Alaska area.

MP 996 INTERPRETATION OF THE TENSILE STRENGTH OF ICE UNDER TRIAXIAL STRESS.

Nevel, D.E., et al. International Conference on Port and Ocean Engineering Under Arctic Conditions, 3rd, Fairbanks, Aug. 11-13, 1975, Vol.1, University of Alaska, 1976, p.375-387, 12 refs. Haynes, F.D. 32-2219

ICE MECHANICS, ICE STRENGTH, TENSILE STRENGTH, STRESSES.

Oriffith, and later Babel, have previously developed a tensile fracture criterion for a two-dimensional state of stress. This theory is extended to the compression-compression region. From this theory the angle of fracture is developed. For uniaxial compression, the angle may be anywhere from 0 to 30 degrees measured from the direction of loading, depending upon the shape of the cavity. The theory is extended conceptually to three dimensions. Triaxial test data by Haynes for secondic are shown in this three dimensions! conceptually to three dimensions.

Haynes for snow-ice are shown in this three-dimensional fracture theory. The test data are slightly less than that predicted when the void in the snow-ice is spherical.

OXYGEN ISOTOPE PROFILES THROUGH THE ANTARCTIC AND GREENLAND ICE SHEETS.

Johnsen, S.J., et al, *Nature*, Feb.25,1972, 235(5339), p.429-434, 37 refs.

Dansgaard, W., Clausen, H.B., Langway, C.C., Jr.

27-3046

ISOTOPE ANALYSIS, ICE SHEETS, OXYGEN ISOTOPES, PALEOCLIMATOLOGY, ICE CORES, GREENLAND, ANTARCTICA—BYRD

28-545

STATION.

The Camp Century, Greenland, deep ice core reveals seasonal variations in the isotopic composition of the ice back to 8,300 y.b.p. This is not the case for the Byrd Station, Antarctica, deep ice core. Both cores show long-term perturbations in isotopic composition reflecting climatic changes from before the beginning of the last glaciation. But the complexity of the glaciology regime at Byrd Station precludes a rational choice of a time scale. Pole-to-pole correlations of the palasoclimatic data therefore become speculative except for the more pronounced features and general trends. general trends.

MP 902 CLIMATIC OSCILLATIONS DEPICTED AND PREDICTED BY ISOTOPE ANALYSES OF A GREENLAND ICE CORE.

Dansgaard, W., et al, International Conference on Port and Ocean Engineering under Arctic Conditions. Proceedings, 1971, 1st, Vol.1, p.17-22, 8 refs. Johnsen, S.J., Clausen, H.B., Langway, C.C., Jr.

ICE CORES, ISOTOPE ANALYSIS, CLIMATIC CHANGES, GREENLAND

MP 1000

TECHNIQUE FOR PRODUCING STRAIN-FREE FLAT SURFACES ON SINGLE CRYSTALS OF ICE: COMMENTS ON DR. H. BADER'S LET-TER AND DR. K. ITAGAKI'S LETTER.

Tobin, T.M., Journal of glaciology, 1973, 12(66), p.519-520, 3 refs.

28-2375 ICE CRYSTALS, CRYSTAL STUDY TECH-NIQUES, MICROSCOPY.

MP 1001

CUTTING ICE WITH HIGH PRESSURE WATER JETS.

Mellor, M., et al, U.S. Coast Guard. Report USCG-D-15-73, Hanover, New Hampshire, U.S. Army Cold Regions Research and Engineering Laboratory, 1973, 22p., AD-766 172.

28-2886

ICE CUTTING, ICE BREAKING, HYDRAULIC JETS.

The report describes high pressure water jet ice cutting experiments conducted in support of the Coast Guard domestice icebreaking program. The test objectives were to determine power requirements for cutting two feet of fresh water ice at a speed of advance of 5 knots. The results of the tests show extremely high power requirements even the tests show extremely high power requirements even using state-of-the art equipment pumping at 100,000 (Auth.)

MP 1002

RIVER-ICE PROBLEMS: A STATE-OF-THE-ART SURVEY AND ASSESSMENT OF RE-SEARCH NEEDS.

Burgi, P.H., et al, American Society of Civil Engine Hydraulics Division. Journal, Jan. 1974, 100(HY1),

Hydraulics Division. Journal, Jan. 1974, 100(HY1), p.1-15, 36 refs. Childers, J.M., Frankenstein, G.E., Kennedy, J.F., Ashton, G.D. 28-2918

RIVER ICE, ICE JAMS, ICE FORMATION, SEA-SONAL FREEZE THAW, ICE MECHANICS, ICE THERMAL PROPERTIES.

MP 1003

ARCTIC AND SUBARCTIC ENVIRONMENTAL ANALYSES USING ERTS-1 IMAGERY. PROGRESS REPORT DEC. 72-JUNE 73.
Anderson, D.M., et al, U.S. National Aeronautics and

Space Administration. Contractor report, June 23, 1973, NASA-CR-135858, 75p., E74-10017.
McKim, H.L., Haugen, R.K., Gatto, L.W.

28-3601 REMOTE SENSING, MAPPING, PERMAFROST DISTRIBUTION, VEGETATION PATTERNS, SEDIMENT TRANSPORT.

SEDIMENT TRANSPORT.
Physiognomic landscape features were used as geologic and vegetative indicators in preparation of a surficial geology, vegetation, and permafrost map at a scale of 1:1 million using ERTS-1 band 7 imagery. The detail from this map compared favorably with USGS maps at 1:250,000 scale. Physical boundaries mapped from ERTS-1 imagery in combination with ground truth obtained from existing small scale maps and other sources resulted in improved and more detailed maps of permafrost terrain and vegetation for the same area. BRTS-1 imagery provides for the first time, a means of monitoring the following regional estuarine processes: daily and periodic surface water circulation patterns, changes in the relative sediment load of rivers discharging into the inlet; and, several local patterns not recognized before, such as a clockwise back eddy offshore from Clam Gulch and a counterclockwise current north of the Forelands. Comparison of ERTS-1 and Mariner imagery has revealed that the thermokarst depressions found on the Alaskan North Slope and polygonal patterns on the Yukon River Delta Slope and polygonal patterns on the Yukon River Delta are possibly analogs to some Martian terrain features.

MP 1004

MORPHOLOGY OF THE NORTH SLOPE Walker, H.J., Alaskan arctic tundra. Bdited by M.E. Britton. Arctic Institute of North America. Technical paper No.25, Washington, D.C., Sept. 1973, p.49-52, Numerous refs.

28-3606 28-3606
PERMAFROST STRUCTURE, ARCTIC TOPOGRAPHY, GEOMORPHOLOGY, TUNDRA TERRAIN, CRYOGENIC PROCESSES, PERMAFROST HYDROLOGY, GROUND ICE, PAT-TERNED GROUND.

MP 1005 PEDOLOGIC INVESTIGATIONS IN NORTH-

ERN ALASKA. Tedrow, J.C.F., Alaskan arctic tundra. Edited by M.E. Britton. Arctic Institute of North America. Technical paper No.25, Washington, D.C., Sept. 1973, p.93-108, Numerous refs. 28-3607

TUNDRA SOILS, ARCTIC SOILS, RESEARCH

MICROMETEOROLOGICAL INVESTIGA-TIONS NEAR THE TUNDRA SURFACE

Kelley, J.J., Alaskan arctic tundra. Edited by M.E. Britton. Arctic Institute of North America. Technical paper No.25, Washington, D.C., Sept. 1973, p. 109-126, Numerous refs.

RESEARCH PROJECTS, MICROCLIMATOLOGY, RADIATION BALANCE, TUNDRA SOILS, SOIL CHEMISTRY.

ARCTIC LIMNOLOGY: A REVIEW. Hobbie, J.B., Alaskan arctic tundra. Edited by M.E. Britton. Arctic Institute of North America. Technical paper No.25, Washington, D.C., Sept. 1973, p.127-168, Numerous refs.

LIMNOLOGY, RESEARCH PROJECTS.

MP 1008 VEGETATIVE RESEARCH IN ARCTIC ALASKA. VENUE LATIVE RESEARCH IN ARCTIC ALASKA.
Johnson, P.L., et al, Alaskan arctic tundra. Edited by
M.E. Britton. Arctic Institute of North America.
Technical paper No.25, Washington, D.C., Sept. 1973,
p.169-198, Numerous refs.
Tieszen, L.L.

TUNDRA VEGETATION, ARCTIC VEGETA-TION, VEGETATION PATTERNS, RESEARCH PROJECTS.

MP 1009

INFLUENCE OF IRREGULARITIES OF THE BED OF AN ICE SHEET ON DEPOSITION RATE OF TILL.

Nobles, L.H., et al, Till: a symposium. Edited by R.P. Goldthwait, Columbus, Ohio State University Press, 1971, p.117-126, 8 refs.

Weertman, J.

GLACIAL TILL, GLACIAL DEPOSITS, GLACIAL FEATURES, GLACIER ICE, SEDIMENT TRANSPORT, ICE THERMAL PROPERTIES, GLACIER ABLATION, GLACIER FLOW.

MODEL SIMULATION OF NEAR SHORE ICE DRIFT, DEFORMATION AND THICKNESS.

Hibler, W.D., III, International Conference on Port and Ocean Engineering Under Arctic Conditions, 4th, St. John's, Sep. 26-30, 1977, Memorial University of Newfoundland, 1978, p.33-44, 15 refs. 32-2339

SEA ICE, ICE MODELS, I ICE MECHANICS.

Simulation results for sea ice drift, deformation and ice thickness variations in the Arctic Basin are presented using a dynamic-thermodynamic model which treats the ice as a rigid plastic continuum. Using available observed atmo-spheric and oceanic forcing data, numerical model simulations spheric and oceanic forcing data, numerical model simulations are made over a four year long period employing one day time steps in a finite difference code with a resolution of 125km. Drift, deformation, stress and ice thickness time series from the simulation results in the near shore region off the Alsakam and Canadian North slope are reported and briefly examined in light of available observations.

DIELECTRIC CONSTANT AND REFLECTION COEFFICIENT OF THE SNOW SURFACE AND NEAR-SURFACE INTERNAL LAYERS IN THE MCMURDO ICE SHELF.

Kovaca, A., et al, Antarctic journal of the United States, Oct. 1977, 12(4), p.137-138, 9 refs.

States, Oct. 1977, 12(4), p.137-136, y reis.
Gow, A.J.
32-2107
SNOW SURFACE, SNOW ELECTRICAL PROPERTIES, ICE SHELVES, ICE ELECTRICAL
PROPERTIES, RADAR ECHOES, ANTARCTICA
—MCMURDO ICE SHELF.
— invalidation and a residual to confile the shape.

—MCMURDO ICE SHELF.

An impulse radar system was used to profile the shape and lateral extent of the brine layer in the McMurdo Ice Shelf.

A small antenna was also used to determine if reflective layers could be detected in the upper 5 m of snow. The radiated impulse center frequency was 626 magahertz with an estimated frequency spectrum of 375 and 875 at the -3 de... act points. The measurement technique is described. The study indicates that layers of dielectric discontinuity can be detected at shallow depths in point snow. The shallow depth at which the internal layers were detected suggests that they represent density variations in the snow, perhaps associated with summer melt features less than 5 mm thick.

MP 1012

ICEBERG THICKNESS PROFILING USING AN IMPULSE RADAR.

Kovacs, A., Antarctic journal of the United States, Oct. 1977, 12(4), p.140-142, 5 refs. 32-2109

ICEBERGS, ICE COVER THICKNESS, RADAR ECHOES, MEASURING INSTRUMENTS.

ECHOES, MEASURING INSTRUMENTS.

Thickness measurements taken on a 100 to 500 m tabular icobers in McMurdo Sound using an impulse radar system are discussed and illustrated.

Calculated depths of the brine layer at the south and north ends of the icoberg were 13.7 and 17.4 m, respectively.

The calculated thickness of the icoberg at station 4.5 and stations 5 through 17 ranged from 90.0 to 60.5 m.

The apparent freeboard-to-thickness analysis of Gow (1968; P-6274) for antarctic ice shelves of similar thickness.

The data suggest a glacial rather than a shelf origin.

MP 1013 SUBSURFACE MEASUREMENTS OF THE ROSS ICE SHELF, MCMURDO SOUND, AN-TARCTICA.

Kovacs, A., et al, Antarctic journal of the United States, Oct. 1977, 12(4), p.146-148, 2 refs.

Gow, A.J. 32-2114

ICE SHELVES, BRINES, ICE COVER THICK-NESS, FIRN, ICE COMPOSITION, ANTARC-TICA—MCMURDO ICE SHELF.

TICA—MCMURDO ICE SHELF.

Depth characteristics, lateral continuity, and inland boundary of sea water infiltration in the McMurdo Ice Shelf were monitored using a dual-antenna impulse radar profiler. The studies have provided new information on the brine infiltration zone, including data on changes in the elevation of the brine-soaked layer and ice shelf thickness as a function of distance from the shelf edge. The features of the brine layer are described and illustrated. Observations on the glacial ice/saline-ice transition on the Koettlitz Glacier tongue are summarized.

MP 1014

SEA ICE STUDIES IN THE WEDDELL SEA RE-GION ABOARD USCGC BURTON ISLAND. Ackley, S.F., Antarctic journal of the United States, Oct. 1977, 12(4), p.172-173, 2 refs.

32-2123

SEA ICE DISTRIBUTION, ICE COVER THICKNESS, PACK ICE, ICE SALINITY, WEDDELL SEA.

Sea ice studies in the Weddell Sea aboard Burton Isi Sea ice studies in the Weddell Sea aboard Burron Island consisted of ice salinity measurements on meltwater from ice cores and thickness measurements taken in drilled holes. Ploes in the northern region were generally thicker than 2 m and in two regions exceeded 3 m on average. At higher latitudes in the middle of the Weddell Sea ice thicknesses exceeded 3.5 m. The thinnest ice was measured at the southernmost locations. It is concluded that advection is an important component in accounting for ice distribution in the Weddell Sea. In vivo fluorescence measurements of core measurements. of core meltwater revealed apparent relationships between ice salinity and biological activity (ice algae).

MP 1015

ENGINEERING PROPERTIES OF SNOW. Mellor, M., Journal of glaciology, 1977, 19(81), p.15-66. In English with French and German summaries.

66, in English with French and German summaries. Refs. p.62-65.
32-2434
SNOW IMPURITIES, SNOW MECHANICS, SNOW THERMAL PROPERTIES, SNOW BLECTRICAL PROPERTIES, SNOW OPTICS, ENGINEERING, SNOW CRYSTALS, SNOWFALL, BLOWING SNOW.

NEERING, SNOW CRYSTALS, SNOWFALL, BLOWING SNOW.

The general properties of snow are described with a view to engineering applications of data. Following an introduction and a short note on the origins of snow, data are given for fall velocities of snow particles, and for mass flux and particle concentrations in falling snow and blowing snow. Notes on the structural properties of deposited snow cover grain size, grain bonds, bulk density, overburden pressure, and permeability. A section on impurities deals with stable and radioactive isotopes, chemical impurities, insoluble particles, living organisms, actidity, and gases. Mechanical properties are treated only selectively, and the reader is referred to another paper for comprehensive coverage. The selective treatment deals with stress waves and strain waves, compressibility, effects of volumetric strain on deviatoric strain, and specific energy for comminution. The section on thermal properties covers heat capacity, latent heat, conductivity, diffusivity, heat transfer by vapor diffusion, heat transfer snd vapor transport with forced convection, and thermal strain. The section on electrical properties of see, and proceeds to a summary of the dielectric properties of ice, and proceeds to a summary of the dielectric properties of ice, and proceeds to a summary of the dielectric properties of snow, including dielectric dispersion, permittivity, dielectric lose, and d.c. conductivity. There are also notes on the thermoelectric effect and c.n electrical charges in falling and blowing snow. The section on optical properties deals with transmission and attenuation of visible radiation, with spectral reflectance, and with long-wave emissivity. The review concludes with some comments on engineering problems that involve snow, and the requirements for research and development. (Auth.)

STRUCTURES IN ICE INFESTED WATER. Assur, A., 1972, [Vol.2], Symposium on Ice and its Action on Hydraulic Structures, 2nd, Leningrad, Sept. 26-29, 1972. Papers, p.93-97, 7 refs.

28-3899 ICE LOADS, OFFSHORE STRUCTURES, ICE PRESSURE, ICE MODELS.

PRESSURE, ICE MODELS.

A method is presented to calculate the effective ice load on vertical structures depending upon width of structure related to ice thickness and fundamental ice properties (enisotropic semirestrained crushing strength, Young's modulus, Possoo's ratio, internal friction). The besic equation satisfies the theoretical identation solution for a straight wall. Both extremes appear as simple intercepts on a plot which futhermore can be linearized. The concept is compared with largely Russian test material and equations which show good agreement. Internal friction must be considered in the analysis since it increases possible ice forces. Due to this local identation forces by ice can be higher as previously assumed for the design of ships.

Buckling instability introduced complications in nucled tests. For structures in the field the random configuration of ice collars must be considered. For this a complete solution is still not available.

MP 1017

MP 1017

REPORT ON ICE FALL FROM CLEAR SKY IN

GEORGIA OCTOBER 26, 1959.
Harrison, L.P., et al, Washington, D.C., U.S. Weather Bureau, 1960, 31p. plus photographs, 12 refs.
Priedman, I., Saylor, C.P., Swinzow, G.K. 28-3913

ICE STRUCTURE, CHEMICAL ANALYSI: METEOROLOGICAL FACTORS, AIRPLANES. The U.S. Weather Bureau, Geological Survey, National Bureau of Standards, National Institutes of Health, and SIPRB investior suncarea, Nasional institutes of Health, and SIPRE investigated the circumstances which resulted in the fall of a 30-40 pound chunk of ice from a clear sky. These agencies concluded that the ice originated from a jet aircraft known to have been flying over the area where the fall was reported. The paper by Swinzow comprises Appendix J of the report.

MP 1018

DESTRUCTION OF ICE ISLANDS WITH EX-

Mellor, M., et al, International Conference on Port and Ocean Engineering Under Arctic Conditions, 4th, St. John's, Sept. 26-30, 1977, Vol.2, Memorial University of Newfoundland, 1978, p.753-765, 20 refs. See also

Kovacs, A., Hnatiuk, J. 32-2384

ICEBERGS, ICE ISLANDS, EXPLOSION EF-FECTS.

Past attempts at explosive demolition of icebergs and ice Past attempts at explosive demolition of icebergs and ice islands are reviewed, and more recent studies are described. Relevant properties of ice are compared with those of typical rocks, and data are given for crater blasting in ice and in rocks. Ice island destruction is analyzed for schemes involving: (1) crater blasting, (2) blasting in water underneath the ice, (3) bench blasting, and (4) controlled presplit blasting. The analyzes favor crater blasting as the most practical method of attack for small bergs and ice islands.

MP 1019 ICEBERG THICKNESS PROFILING.

Kovacs, A., International Conference on Port and Ocean Engineering Under Arctic Conditions, 4th, St. John's, Sept. 26-30, 1977, Vol.2, Memorial University of Newfoundland, 1978, p.766-774, 16 refs.

ICEBERGS, ICE COVER THICKNESS, RADAR ECHOES, PROFILES.

ECHOES, PROPILES.

Results obtained with an impulse radar system used to profile the thickness of a tabular iceberg in McMurdo Sound, Antarctica, and an ice island in the Beaufort Sea near Flaxman Island, Alsaka, are presented. Oraphic records are shown of the radar impulse travel time which clearly reveal, for the first time, the bottom relief of each ice formation. Also detected and shown are echo signatures from internal cracks and a limitation-brine laver. The time of flight of the activities and anown are eano signatures from internal cracks and a. i...diltration-brine layer. The time of flight of the radar impulse in the ice island is compared with a 24.05-m drill hole measurement of the ice thickness. The effective velocity of the radar impulse in the ice island was found to be 0.16 m/ns and the effective dielectric constant of the ice to be 3.5. (Auth.)

MP 1020 TOWING ICEBERGS.

LONAING ICEISERGS.
Lonadale, H.K., et al, Bulletin of the Atomic Scientists,
March 1974, 30(3), p.2, Includes response by W.F.
Weeks and W.J. Campbell. 2 refs.
Weeks, W.F., Campbell, W.J.
28-3927

ICEBERGS, WATER SUPPLY, LOGISTICS, ICE

ICEBERGS, WATER SUPPLY, LOGISTICS, ICE MELTING, ECONOMICS.

Referring to the article by Weeks and Campbell (1973; F-12650 or 28-898) the author questions the following facets of towing icebergs: the costs of surveillance; the capital costs of the super-tug; the methods of melting, collecting the fresh water on the high seas, and transporting to the Atacama desert or central Australia; and how the total cost compares with the value of water at the intended use site. Weeks and Campbell cite their paper on this subject (1973;

F-12780 or 28-1322) which has included the costs of capitaliza-tion and a method of melting and collecting fresh water. It is suggested that surveillance costs would be small, and the authors do not believe their estimates of water costs

MP 1021

USE OF EXPLOSIVES IN REMOVING ICE JAMS.

Frankenstein, G.B., et al, Symposium on Ice and its Action on Hydraulic Structures, Reykjavík, Iceland, Sept. 7-10, 1970. Papers and discussions, Reykjavík, Iceland, International Association for Hydraulic Reearch, 1970, 10p., Session 3.13. 6 refs

Smith, N. 28-3992

ICE JAMS, ICE CONTROL, EXPLOSIVES, ICE REMOVAL.

A brief history of the use of explosives for ice jam removal is discussed. Ammonium nitrate mixed with fuel oil is considered the best explosive for ice jam control because of its cost and safety features. For maximum effect, the charge should be placed in the water below the ice. Accurve is included which gives maximum crater hole dismers as a function of the cube root of the charge weight.

MP 1022

MP 1022 CLASSIFICATION AND VARIATION OF SEA ICE RIDGING IN THE ARCTIC BASIN. Hibler, W.D., III, et al, AIDJEX bulletin, Jan. 1974, No.23, p.127-146, 16 refs. Mock, S.J., Tucker, W.B.

28-4069 SEA ICE, ICE STRUCTURE, ICE PRESSURE, ICE MODELS, PRESSURE RIDGES.

MODBLS, PRESSURE RIDGES.

A one-parameter model for pressure ridges is developed and compared with good agreement to more than 3000 km of leser profile data taken from November 1970 to February 1973 in the Arctic basin. Using a parameter called ridging intensity, which may be determined for a region from the mean number of ridges per unit length and the mean ridge height, the number of ridges per kilometer at any height level may be predicted. Results from a study of regional and temporal variation in ridging indicate that although magnitudes of ridging intensity vary in time, the relative regional variations are similar. Consequently, three distinct regions of ridging intensity thaving relatively stable boundaries can be defined. Annual variation in new ice production due to ridging is sufficiently large to suggest that ridging plays an important role in the overall mass balance of the Arctic basin.

MP 1023

SALINITY VARIATIONS IN SEA ICE.

Coy, G.F.N., et al. Journal of glaciology, 1974, 13(67), p.109-122, In Bnglish with French and German summaries. 3 refs. Weeks, W.F.

SEA ICE, CHEMICAL ANALYSIS, SALINITY, ICE COVER THICKNESS.

ICE COVER THICKNESS.

The salinity distribution in multi-year sea ice is dependent on the ice topography and cannot be adequately represented by a single average profile. The cores collected from areas beneath surface humnocks generally showed a systematic increase in salinity with depth from 0 per mille at the surface to about 4 per mille at the base. The cores collected from areas beneath surface depressions were much more saline and displayed lerge salinity fluctuations. Salinity observations from sea ice of varying thicknesses and age collected at various Arctic and sub-Antarctic locations revealed a strong correlation between the average as alinity of collected at various Arctic and sub-Antarctic locations revealed a strong correlation between the average salinity of the ice S and the ice thickness h. For salinity samples collected from cold sea ice at the end of the growth season, this relationship can be represented by two linear equations: S = 14.24 - 19.39 h (h < 0.4 m); S = 7.88 - 1.59 h (h > 0.4 m). It is suggested that the pronounced break in slope at 0.4 m is due to a change in the dominant brine drainage mechanism from brine expulsion to gravity drainage. A linear regression for the data collected during the melt season gives S = 1.58 + 0.18 h. An annual cyclic variation of the mean salinity exists for multi-year ses ice. The mean salinity reaches a maximum at the end of the growth season and a minimum at the end of the melt season.

ICE PORCES ON VERTICAL PILES.

Nevel, D.E., et al, U.S. Army Science Conference, West Point, N.Y., June 20-23, 1972. Proceedings. Vol. III, Washington, D.C., U.S. Army Research and Development Office, 1972, p.104-114, AD-750 358, 16 refs.

Perham, R.E., Hogue, G.B. 29-121

SEA ICE, ICE PRESSURE, PILE STRUCTURES. The force that floating ice sheets can exert on vertical piles is important to the design of both military and civilian structures. Present design codes call for 400 psi as the crushing strength of ice without regard to the influencing factors and their variation. The forces which drive the ice into the structure can be water currents, wind, or thermal expansion. These driving forces may be large enough to cause the ice to fail at or near the surface. The

purpose of this research is to define this limiting force level and gain a better understanding of the failure process in the ice. (Auth.)

MP 1025

WATER PERCOLATION THROUGH HOMO-

GENEOUS SNOW.

Colbeck, S.C., et al, The role of snow and ice in hydrology; proceedings of the Banff Symposia, Sept. 1972, Vol.1, Geneva, Switzerland, WMO-IAHS, Unesco, 1973, p.242-257, With French summary. 7 refs. Includes discussions.

Davidson, G. 29-211

SNOW WATER CONTENT, SNOWMELT, SNOW COVER STRUCTURE, SNOW PERMEABILITY.

COVER STRUCTURE, SNOW PERMEABILITY.
The gravity flow theory of water percolation through snow
is generalized to include any power law relationship between
permeability to the water phase and effective water saturation.
Experimental observations of water percolation through homogeneous snow are described. It is found that the exponent
in the power law is about 3 for homogeneous snow. The
theory is used to construct diurnal meltwater waves and
those compare favorably with the observed waves. The
differences between the results found for natural snow and
those found for repacked snow are discussed. The lower
limit of applicability of the gravity flow theory is uncertain.

SEASONAL REGIME AND HYDROLOGICAL SIGNIFICANCE OF STREAM ICINGS IN CEN-TRAL ALASKA.

Kane, D.L., et al, The role of snow and ice in hydrology; proceedings of the Banff Symposia, Sept. 1972, Vol.1, Geneva, Switzerland, WMO-IAHS, Unesco, 1973, p. 528-540, With French summary. 16 refs. Includes discussions.

Slaughter, C.W. 29-232

RIVER ICE, FREEZEUP, ICE FORMATION, AERIAL PHOTOGRAPHY, METEOROLOGICAL FACTORS, HYDROLOGIC CYCLE.

FACTORS, HYDROLOGIC CYCLE.

Many streams in Arctic and sub-Arctic regions are characterized by accumulations of ice in the channel and nearby floodplain during the winter months. Field data on the rates of growth of this icing and on various climatic factors has been collected at a small research watershed near Fairbanks, Alaska. The volume of icing growths is estimated from aerial photographs. Hydrologic implications are derived by comparing the volume of these icings with other elements of the hydrologic cycle. Discussion on how the hydrologic cycle is modified by these ice accumulations is also included.

MEASURING THE UNIAXIAL COMPRESSIVE

MEASURING THE UNIAXIAL COMPRESSIVE STRENGTH OF ICE. Haynes, F.D., et al, Journal of glaciology, 1977, 19(81), p.213-223, In English with French and German summaries. 7 refs.

Mellor, M. 32-2445

COMPRESSION, COMPRESSIVE STRENGTH, ICE STRENGTH, SHEAR STRESS, ICE CRYSTALS, MEASURING INSTRUMENTS. SIRENGIH, ICE STRENGIH, SHEAR STRESS, ARE STRESS, ARE STRESS, MEASURING INSTRUMENTS. An attempt was made to develop a simple but accurate method for making compressive strength tests on right circular cylinders. Compliant loading platens were designed to apply uniform normal stress without introducing significant interface radial shear stresses. The compliant platens gave reproducible results that agree well with results obtained by a precise conventional technique. Accurate results were obtained with simple specimen preparation, and with short specimens where the length-to-diameter ratio was less than unity. Platens were made from a rubber-like uretianse which was molded in aluminum cylinders to provide lateral ventraint. Uniaxial compression tests on cylindrical polycrystalline ice specimens were made to determine the characteristics of the platens. For 21 specimens with ends prepared on a lapping plate to obtain a mirror finish, the measured strength showed a variation of only 13% for length-to-diameter ratios from 0.74 to 2.5, with no systematic trend. Another 21 specimens with length-to-diameter ratios of about 2.35 were tested with various platens and various methods of specimen end preparation. The strength for specimens with saw-cut ends and for those with ends lapped showed very little difference when tested with the rubber platens.

INVESTIGATION OF AUTOMATIC DATA COL-LECTION EQUIPMENT FOR OCEANOGRAPH-IC APPLICATIONS.

Dean, A.M., Jr., International Conference on Port and Ocean Engineering Under Arctic Conditions, 4th, St. John's, Sept. 26-30, 1977, Vol.2, Memorial University of Newfoundland, 1978, p.1111-1121, 13 refs. 32-2407

REMOTE SENSING, MONITORS, OCEANOG-RAPHY, DATA PROCESSING, METEOROLOGI-CAL DATA.

This paper deals with the instrumentation requirements for in-situ monitoring of specified factors in open water. It contains application information suitable for an organization initiating or extending an oceanographic data collection pro-

gram. The analysis includes an investigation and evaluation of sensing methodology, sensors, monitoring equipment, an available data collection systems. A comparison of available equipment for a first-year effort is presented.

MP 1029

MESOSCALE MEASUREMENT OF SNOW-COVER PROPERTIES.

Bilello, M.A., et al, The role of snow and ice in hydrology; proceedings of the Banff Symposia, Sept. 1972, Vol.1, Geneva, Switzerland, WMO-IAHS, Unesco, 1973, p.624-643, With French summary. 16

Bates, R.E., Riley, J.

SNOW DEPTH, SNOW DENSITY, METEORO-LOGICAL FACTORS, SNOW TEMPERATURE.

LOGICAL FACTORS, SNOW TEMPERATURE. Physical characteristics of the snow cover and associated meteorological conditions were observed at nineteen sites in and around Fort Greely, Alaska, during the winter of 1966-67. Saowhill totaled 245 cm and maximum snow depths of 80 to 100 cm were observed in a major portion of Fort Greely. Measurements at nine sites showed the snow density to be light; for example, the average density in the forest was less than 0.24 g/cc. However, exceptions could be expected as observed at Jarvis Creek, where the density averaged 0.33 g/cc. Daily temperature measurements made within the snow pack also showed that the anow in the forest was colder than that at exposed sites. Associations between snow cover properties and weather were tested and the results substantiated previous studies, which showed good relationships between seasonal snow cover density and windspeed/air temperatures.

MP 1030 ARCTIC AND SUBARCTIC ENVIRONMENTAL ANALYSES UTILIZING ERTS-1 IMAGERY. BIMONTHLY PROGRESS REPORT, 23 AUG. 23 OCT. 1973.

23 UCI. 1973.
Anderson, D.M., et al, U.S. National Aeronautics and Space Administration. Contractor report, Oct. 23, 1973, NASA-CR-135846, 3p., N74-11146. McKim, H.L., Haugen, R.K., Gatto, L.W., Slaughter, C.W., Mariar, T.L.

REMOTE SENSING, ERTS IMAGERY.

ARCTIC AND SUBARCTIC ENVIRONMENTAL ANALYSES UTILIZING ERTS-1 IMAGERY. BIMONTHLY PROGRESS REPORT, 23 OCT. - 23 DEC. 1973.

DEC. 1973.

Anderson, D.M., et al, U.S. National Aeronautics and Space Administration. Contractor report, Dec. 23, 1973, NASA-CR-136293, 6p., N74-14034.

McKim, H.L., Haugen, R.K., Gatto, L.W., Slaughter, C.W., Marlar, T.L.

REMOTE SENSING, ENVIRONMENTS, ERTS IMAGERY.

MP 1032

RESULTS OF THE US CONTRIBUTION TO THE JOINT US/USSR BURING SEA EXPERI-MENT.

Campbell, W.J., et al., U.S. National Aeronautics and Space Administration. Technical memorandum, May 1974, NASA-TM-X-70648, 197p., N74-22971,

Chang, T.C., Fowler, M.G., Gloersen, P., Ramseier, R.O., Kuhn, P.M., Ross, D.B., Stambach, G., Webster, W.J., Jr., Wilheit, T.T. 29-902

SEA ICE, ICE MECHANICS, ICE STRUCTURE, DRIFT, METEOROLOGICAL FACTORS.

DRIFT, METEOROLOGICAL FACTORS.
The atmospheric circulation which occurred during the Bering Sea Experiment, 15 February to 10 March 1973, in and around the experiment area is analyzed and related to the macroscale morphology and dynamics of the sea ice cover. The ice cover was very complex in structure, being made up of five ice types, and underwent strong dynamic activity. Synoptic analyses show that an optimum variety of weather altuations occurred during the experiment: an initial strong anticyclonic period (6 days), followed by a period of strong cyclonic activity (6 days), followed by a period of strong cyclonic activity (4 days). The data of the mesoncale test areas observed on the four sea ice option flights, and ship weather, and drift data give a detailed description of mesoscale lost dynamics which correlates well with the macroscale view: anticyclonic activity advects the ice southward with strong ice divergence and a regular lead and polynya pattern; cyclonic activity advects the ice northward with ice convergence, or slight divergence, and a random lead and polynya pattern. (Auth.)

MP 1033 PROPANE DISPENSER FOR COLD FOG DISSI-PATION SYSTEM.

PATION SYSTEM.

Hicks, J.R., et al, U.S. Air Force Electrical Systems Division, L.G. Hanscomb Field, Mass., ESD-TR-73-208, Hanover, New Hampshire, Cold Regions Research and Engineering Laboratory, 1973, 38p., AD-762 292. Includes as App. B, Evaluation of cloud seeding with liquefied propane by Veal and Auer. 4 refs. Lukow, T.E., Veal, D.L., Auer, A.H., Jr. 29.1286. 29-1286

POG DISPERSAL, AIRCRAFT LANDING AREAS, AEROSOLS, SMOKE GENERATORS, COST ANALYSIS.

MP 1034

ICE-CRATERING LAKE, ALASKA. **EXPERIMENTS**

Kurtz, M.K., et al, U.S. Army Engineer Nuclear Cratering Group, Livermore, Calif. Technical memorandum, Nov. 25, 1966, NCG/TM 66-7, Various pagings, No microfiche available.

Benfer, R.H., Christopher, W.G., Frankenstein, G.E., Van Wyhe, G., Roguski, E.A. 29-1921

LAKE ICE, EXPLOSION EFFECTS, ICE BREAK-

CARE ICE, EXPLOSION EFFECTS, ICE BREAK-UP.

Operation BREAKUP, FY 66, was a series of small, single and row charge, chemical explosive detonations fired in fresh water to crater the overlying sheet ice. The experiments were conducted in the winter of 1966 under three feet of ice at Blair Lake, 33 miles SSE of Fairbanks, Alaska. The operation had the following purposes:

(1) to determine the cratering effects of single and row charges detonated below an ice layer; (2) to study bubble coalescence; and (3) to support theoretical studies of cratering physics. Technical programs included crater measurements, ice surface motion, engineering properties, and fish surveys. Some results and conclusions were:

(1) the relationship between depth of detonation and ice crater radius has been defined for 136 pound C4 spherical charges for various experimental conditions; (2) shock wave reflection from the lake bottom did not appear to enhance the crater dimensions; (3) row charge crater dimensions were defined for three charge spacines; (4) cracks appeared to propagate better from larger yield explosions under ice of the same thickness; (5) there did not appear to be any evidence of bubble coalescence in the experiments; (6) commonly used scaling laws may be used to estimate the effects of higher yield ice creating explosions; (7) the procedures used are adaptable to civil application; (8) a detailed evaluation was made of the effects of under-ice explosions on fish; and (9) maintenance of open water gaps created by explosions is affected by refereing applications of the BREAKUP results are included.

MP 1035

MESO-SCALE STRAIN MEASUREMENTS ON THE BEAUFOURT SEA PACK ICE (AIDJEX

Hibler, W.D., III, et al, Problemy Arktiki i Antarktiki; Sbornik statel, 1974, Vol.43-44, p.119-138, In Russian.

Weeks, W.F., Ackley, S.F., Kovacs, A., Campbell, 29-2023

PACK ICE, ICE DEFORMATION, DRIFT, AERI-AL RECONNAISSANCE, ICE REPORTING, AERIAL PHOTOGRAPHS

MP 1036 LAND TREATMENT OF WASTEWATERS.

Reed, S.C., et al, Army research and development, Nov.-Dec. 1974, p.12-13. Buzzell, T.D. 29-2193

WASTE TREATMENT, SEEPAGE, SURFACE DRAINAGE.

MP 1037 USE OF DE-ICING SALT-POSSIBLE ENVI-

RONMENTAL IMPACT. Minsk, L.D., Highway research record, 1973, No.425,

p.1-2. 29-2220 CHEMICAL ICE PREVENTION, SALTING.

Humorous introduction to a series of 8 reports on various aspects of salting.

MP 1038 DEPTH OF WATER-FILLED CREVASSES THAT ARE CLOSELY SPACED.

Robin, G. de Q., et al, Journal of glaciology, 1974, 13(69), p.543-544, Robin's comments on Weertman's article "Can a water-filled crevasse reach the bottom surface of a glacier?" and Weertman's reply. 5 refs Weertman, J.

29-2424 GLACIER GLACIER ICE, CREVASSES, UNFROZEN WATER CONTENT, ATMOSPHERIC PRES-

MP 1039 NEW ENGLAND RESERVOIR MANAGEMENT: LAND USE/VEGETATION MAPPING IN RESERVOIR MANAGEMENT (MERRIMACK RIVER BASIN).

Cooper, S., et al, U.S. National Aeronautics and Spa Administration. Contractor report, June 14, 1974, NASA-CR-139239, 30p., E74-10669. McKim, H.L., Gatto, L.W., Merry, C.J., Anderson,

29-2456
REMOTE SENSING, AERIAL PHOTOGRAPHY, VEGETATION PATTERNS, MAPPING.

VEGETATION PATTERNS, MAPPING. It is evident from this comparison that for land use/vegetation mapping the S190B Skylab photography compares favorably with the RB-57 photography and is much superior to the ERTS-1 and Skylab 190A imagery. For most purposes the 12.5 meter resolution of the S190B imagery is sufficient to permit extraction of the information required for rapid land use and vegetation surveys necessary in the management of reservoir or waterahed. The ERTS-1 and S190A data products are not considered adequate for this purpose, although they are useful for rapid regional surveys at the level 1 category of the land use/vegetation classification system.

MP 1040 REMOTE SENSING PROGRAM REQUIRED FOR THE AIDJEX MODEL.

Weeks, W.F., et al, Arctic Ice Dynamics Joint Experi-AIDJEX bulletin, Nov. 1974, No.27, p.22-44, 18 refs.

Coon, M.D., Campbell, W.J. 29-2683

RESEARCH PROJECTS, SBA ICE, REMOTE SENSING, ICE MODELS, ICE COVER THICK-NESS, STRAINS, SURFACE ROUGHNESS, AERI-PHOTOGRAPHS, MEASURING INSTRU-MENTS

MP 1041 INVESTIGATION OF ICE FORCES ON VERTI-CAL STRUCTURES.

Hirayama, K., et al, Iowa. University. Institute of Hydraulic Research. IIHR report, June 1974, No.158, 153p., 57 refs. Schwarz, J., Wu, H.-C. 29-2975

ICE LOADS, OFFSHORE STRUCTURES, ICE CRACKS, FRACTURE ZONES, TENSILE STRENGTH, PILE STRUCTURES, STRAIN

TESTS.

The Iowa Institute of Hydraulic Research has undertaken model studies on the investigation of ice forces on vertical piles. Model techniques for the study of ice-breaking phenomena have been developed, and the similarity between the model indications and prototype conditions has been demonstrated. Tests on the relationships between ice forces (ice strength) and pile diameter, ice thickness, and relative velocity (strain rate) between ice and structure have been completed. The experimental results were satisfactorily explained by a theoretical approach, and the combination of these relationships led to a basic empirical formula for the calculation of the maximum penetration strength for a circular pile, which agrees with available field measurements and also in part with model investigations in Russia. The suggested formula was modified for application to different structural shapes and degree of contact between ice and structure as well as for application to the indentation case of pile-ice interaction.

MP 1042 STABILITY OF ANTARCTIC ICE.

certman, J., Nature, Jan. 17, 1975, 253(5488), p.159. 29-3124

ICE SHEETS, ICE SHELVES, FLOW RATE, ICE COVER THICKNESS, ANTARCTICA—ROSS ICE

SHELF.
The author comments on the continued existence of the apparently unstable West Antarctic Ice Sheet and Ross Ice Shelf.
The new field data on the Ross Ice Shelf and fast moving ice streams obtained by G. Robin (29-3125 or F-14813) is considered essential to the future solution of this geophysical puzzle. It is possible that the West Antarctic Ice Sheet is indeed disintegrating as suggested by T. Hughes (29-0067 or F-12956). A more accurate answer to this question should be obtainable from a three dimensional glacier mechanics analysis carried out with the aid of computer calculations or with field observations. It is hoped that Robin's data on ice streams may also help to solve the problem of why fast moving ice streams form near the edge of the West Antarctic Ice Sheet.

MP 1043 SOIL PROPERTIES OF THE INTERNATIONAL TUNDRA BIOME SITES.

TUNDRA BIUME GILES.
Brown, J., et al, International Biological Programme
Tundra Biome. Microbiology, Decomposition and
Invertebrate Working Groups. Meeting, University Inuaria Biome. Micronology, Decomposition and Invertebrate Working Groups. Meeting, University of Alaska, Fairbanks, August 1973. Proceedings (Soil organisms and decomposition in tundra), Stockholm Sweden, International Biological Program, Tundra Biome Steering Committee, 1974, p.27-48, 31 refs. 29-3348

TUNDRA SOILS, SOIL COMPOSITION, SOIL CHEMISTRY, TUNDRA BIOME, SOUTH GEORGIA, SIGNY ISLAND, MACQUARIE IS-LAND.

LAND.

The soils of the national Tundra Biome sites, which include subantarctic locations, reflect a significantly wide range of soil-forming factors and conditions. It is the purpose of this report to present the most representative set or sets of soil data available for each national project. Presentation of data is confined to the upper three to four soil layers or horizons since these are the most biologically significant for purposes of this volume and other Tundra Biome synthesis activities. The main emphasis here is to provide physical, chemical and thermal soils properties which supplement data presented elsewhere in this volume and which are required for subsequent interpretations of those reports. A brief summary of major soil conditions at each site is given in order to provide the uninitiated reader with a cursory understanding of the soil physical environment.

MP 1044 CAN A WATER-FILLED CREVASSE REACH THE BOTTOM SURFACE OF A GLACIER?.

Weertman, J., International Association of Scientific Hydrology. Publication, 1973, No.95, p.139-145, 7 In English with French summary. refs., I

CREVASSES, SUBGLACIAL DRAINAGE, PENE-TRATION, TENSILE STRESS, ICE PRESSURE, ANALYSIS (MATHEMATICS), CREEP PROPER-TIES, MAGMA.

MP 1045 ELECTRICAL RESISTIVITY PROFILE OF PER-MAFROST.

Hoekstra, P., National Research Council, Canada. Associate Committee on Geotechnical Research. Technical memorandum, Nov. 1974, No.113, p.28-34, 6 refs.

ELECTRICAL RESISTIVITY, PERMAPROST STRUCTURE, DIELECTRIC PROPERTIES, UN-FROZEN WATER CONTENT.

MP 1046 AIRBORNE E-PHASE RESISTIVITY SURVEYS OF PERMAFROST - CENTRAL ALASKA AND MACKENZIE RIVER AREAS.

Sellmann, P.V., et al, National Research Council, Canada. Associate Committee on Geotechnical Re-search. Technical memorandum, Nov. 1974, No.113, p.67-71.

McNeill, J.D., Scott, W.J. 30-810

PERMAFROST INDICATORS, ELECTRICAL RESISTIVITY, AIRBORNE EQUIPMENT, SURFACE STRUCTURE, DISCONTINUOUS PERMA-FROST

ARCTIC AND SUBARCTIC ENVIRONMENTAL ANALYSIS UTILIZING ERTS-1 IMAGERY. FINAL REPORT JUNE 1972-FEB. 1974.

Anderson, D.M., et al, U.S. National Aeronautics and Space Administration. Contractor report, Feb. 28, 1974, NASA-CR-142538, 128p.
McKim, H.L., Gatto, L.W., Haugen, R.K., Crowder, W.K., Slaughter, C.W., Marlar, T.L.

30-1296

30-1270 RIVER FLOW, SEDIMENTS, PERMAFROST DIS-TRIBUTION, SNOW COVER, RIVER ICE, SEA ICE, MAPPING, REMOTE SENSING, ERTS IM-AGERY.

AGERY.

The author has identified the following significant results. ERTS-1 imagery provides a means of distinguishing and monitoring estuarine surface water circulation patterns and changes in the relative sediment load of discharging rivers on a regional basis. Physical boundaries mapped from ERTS-1 imagery in combination with ground truth obtained from existing small scale maps and other sources resulted in improved and more detailed maps of permafrost terrain and vegetation for the same area. Snowpack cover within a research watershed has been analyzed and compared to ground data. Large river icings along the proposed Alaska pipeline route from Prudhoe Bay to the Brooks Range have been monitored. Sea ice deformation and drift northeast of Point Barrow, Alaska have been measured during a four

day period in March and shore-flat ice accumulation and ablation along the west coast of Alaska have been mapped for the spring and early summer seasons. MP 1048

WASTE MANAGEMENT IN THE NORTH.

Rice, E., et al. Northern engineer, Winter 1974-75, 6(4), p.14-21.

30-1598

WASTE TREATMENT, SEWAGE TREATMENT. SANITARY ENGINEERING.

ELECTRICAL GROUND IMPEDANCE MEAS-UREMENTS IN ALASKAN PERMAFROST RE-

Hockstra, P., U.S. Federal Aviation Administration. Research and development report, April, 1975, FAA-RD-75-25, 60p., ADA-011 458, 18 refs. 30-1855

ELECTRICAL RESISTIVITY, WAVE PROPAGA-TION, PERMAFROST DEPTH, PERMAFROST THICKNESS, RADIO WAVES.

THICKNESS, RADIO WAVES.

New results about ground conductivity in North America became available from geophysical studies near Fairbenks, from sites along the Alsaka Pipeline and in several areas of the Canadian Arctic; at these locations ground and/or arrorne conductivity measurements were made by measuring the wavetilt and/or the surface impedance of radio ground-waves. The results showed that the ground conductivity in permafrost areas of North America is very heterogeneous, so that it is not directly apparent how to assign an effective conductivity value to a path of practical length (approx. 100 km). The geological and permafrost conductions vary much in Alsaka, so that measurements at a location are representative of a small area only, leaving large areas of Alsaka open to question. Theoretical evaluations of the seasonal changes in ground conductivity and their effect on radiowave propagation and electrical grounding are also discussed.

MP 1050

BARROW, ALASKA, USA.

Bunnell, F.L., et al, Sweden. Statens naturvetenskapliga forskningsrad. NFR ecological bulletins, 1975, No.20, International Meeting on Biological Produc-tivity of Tundra, 5th: IBP Tundra Biome, Abisko, Sweden, April 16-24, 1974. Structure and function of tundra ecosystems, edited by T. Rosswall and O.W. Heal, p.73-124, 79 refs. MacLean, S.F., Jr., Brown, J. Structure and function of

TUNDRA CLIMATE, SOLAR RADIATION, SNOWMELT, TUNDRA VEGETATION, MOSSES, LICHENS, SOIL COMPOSITION, UNITED STATES—ALASKA—BARROW.

MP 1051

RADIATION AND EVAPORATION HEAT LOSS DURING ICE FOG CONDITIONS.

McFadden, T., National Research Council, Canada.

Associate Committee on Geotechnical Technical memorandum, Jan. 1975, No.114, p.18-27, 8 refs.

ICE FOG, HEAT LOSS, EVAPORATION, WATER TEMPERATURE, RADIATION, WIND (METEOROLOGY), UNITED STATES—ALAS-KA.

MP 1052

C-14 AND OTHER ISOTOPE STUDIES ON NATURAL ICE.

Oeschger, H., et al. International conference on radiocarbon dating, 8th, Oct. 18-25, 1972. Proceedings. Vol. 1, Wellington, Royal Society of New Zealand, 1972, p.D70-D92, 26 refs.

Stauffer, B., Bucher, P., Frommer, H., Moll, M., Langway, C.C., Jr., Hansen, B.L., Clausen, H.B. 30-3086

ICE DATING, ISOTOPE ANALYSIS, GLACIER ICE.

ICE.

On several field projects in Greenland, Antarctica and the Swiss Alps, the extraction technique of traces from several tons of ice has been developed and perfected. The procedures are as follows. Surface ice samples are melted in vacuum melt vessels, whereas in bore holes the ice is melted in situ under vacuum at the desired depth. Until now the maximum depth from which samples have been extracted is 780 m. The gases escaping during the melting process are pumped through a molecular sieve for drying and collection of CO2. The remaining gases are compressed for further treatment in the laboratory. Soluble chemistry may be carried out either on the melt water pumped to the surface (collection of Si) or down hole by circulating the melt water through ion exchange resins (collection of CO2). The melt water can be filtered for the collection of CO2. Ar and Si samples can be obtained for radioisotopic dating. The results of the Si-32 samples allow us to establish an apparent helf-life for \$1.32 dating. The possible causes of the C-14 variations are discussed and ways to solve the problem suggested. (Auth.)

ECOLOGICAL INVESTIGATIONS OF THE TUNDRA BIOME IN THE PRUDHOE BAY RE-GION, ALASKA

Brown, J., ed. Alaska. University. Biological papers, Oct. 1975, No.2, 215p., For selected papers see 30-3305 through 30-3313. Numerous refs. 30-3304

TUNDRA SOILS, TUNDRA VEGETATION, SNOW COVER, ANIMALS, TUNDRA BIOME, UNITED STATES—ALASKA—PRUDHOE BAY. During the period 1970-1974, the U.S. Tundra Biome Program, which was stationed primarily out of Barrow, performed a series of environmental and terrestrial ecological studies

which was stationed primarily out of Barrow, performed a series of environmental and terrestrial ecological studies at Prudhoe Ray. This volume reports specifically on the Prudhoe results and is divided into three major subdivisions: (1) abiotic and soil investigations, (2) plant investigations, and (3) animal investigations. The abiotic section contains papers on the air and soil temperature regimes; the snow cover, particularly its properties adjacent to the roadnet; major soil and landform associations, and the chemical composition of soils, runoff, lakes, and rivers. The plant section contains reports on a general vegetation survey; a following vegetation mapping project, and a study of the growth of arctic, boreal, and alpine biotypes in an experimental transplant garden. The animal section contains reports on the tundra invertebrates; the bird, lemming, and for populations, and the behavioral and physiological investigations of caribou and several experimental reindeer. Appendices contain a checklist of the vascular, bryophyte, and lichen flors of the Prudhoe Bay area and selected data on vegetation. Several of the papers draw comparisons with the Barrow tundra. The volume includes a considerable number of tables in its attempt to document for the first time the abiotic, flora, and fauna of this relatively unknown arctic tundra landscape.

MP 1054

MP 1054

SELECTED CLIMATIC AND SOIL THERMAL CHARACTERISTICS OF THE PRUDHOE BAY REGION.

Brown, J., et al, Alaska. University. Biological papers, Oct. 1975, No.2, p.3-12, 7 refs. Haugen, R.K., Parrish, S. 30-3305

TUNDRA SOILS, CLIMATE, AIR TEMPERA-TURE, SOIL TEMPERATURE, UNITED STATES —ALASKA—PRUDHOE BAY.

NEAR REAL TIME HYDROLOGIC DATA ACQUISITION UTILIZING THE LANDSAT SYS-

McKim, H.L., et al, Conference on soil-water prob-lems in cold regions, Calgary, Alberta, Canada, May 6-7, 1975, Proceedings, 1975, p.200-211, 4 refs. Anderson, D.M., Berg, R.L., Tuinstra, R.L.

Angereus, 2...., 30-3342
REMOTE SENSING, SPACECRAFT, DATA
TPANSMISSION, MEASURING INSTRU-TRANSMISSION, MENTS, LANDSAT.

MENTS, LANDSAT.

The LANDSAT Data Collection System (DCS) provides the capability of rapidly collecting hydrologic, meteorologic and environmental data at remote sites throughout the United States and Canada. The coded signals are transmitted via satellite to NASA ground receiving stations where the data are compiled and teletyped to the user. The number of transmissions per day varies considerably depending on the location of each data collection platform (DCP). During the past two years, many sensors have been interfaced to the DCP; one of the most important is a porous cup tensiometer constructed so that a transducer provides a continuous reading of pore water pressure. Field tests have shown that the transmissions from the DCP are accurate and reliable. This system appears to provide a reliable means of measuring pore water pressure at freeze-up and thaw, critical data needed for validation of current hydrologic models.

AMP 1656

MP 1056 GLACIOLOGY'S GRAND UNSOLVED PROB-

Weertman, J., Nature, Mar. 25, 1976, 260(5549), p.284-286. 30-3369

ICE SHEETS, GLACIER OSCILLATION, ICE SHELVES, SEA LEVEL.

SHELVES, SEA LEVEL.
Giaciology's grand unsolved problem, or set of interrelated problems, concerns the West Antarctic Ice Sheet: how it formed, whether it it growing or diaintegrating, why fast moving ice streams form at its periphery, etc. Geological evidence indicates that before 10,000 yr ago the West Antarctic Ice Sheet was much larger, covering the area, now below sea level, presently occupied by the Rosa Ice Shelf and that a large scale retreat took place at its edge. The retreat was probably caused by the large rise in sea level that occurred when the ice sheets in the northern hemisphere melted at the end of the last ice age. It has been suggested that the West Antarctic Ice Sheet is still disintegrating, its edge retreating where it joins the Rosa Ice Shelf on the order of 70 m/yr. This slowly occurring destruction could account for the present rate of rise of the mean sea level. Recent data collected on the Rosa Ice Shelf reaches the startling conclusion that the position of the edge of the ice sheet at least at one location is advancing

at the very fast rate of 1 km/yr. Extensive field data will be required to determine whether the ice sheet is disintegrating or growing and at what rate.

MP 1057

MECHANICAL PROPERTIES OF SNOW USED AS CONSTRUCTION MATERIAL

Wuori, A.F., Leningrad. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy, 1975, Vol.326, p.157-164, In Russian. 14 refs. 30-3626

SNOW (CONSTRUCTION MATERIAL), SNOW ROADS, ICE ROADS, ICE RUNWAYS, SNOW MECHANICS, SNOW COMPACTION, SNOW BEARING STRENGTH, TESTS.

Various methods are feasible for processing snow into a construction material in polar areas where conventional materials are uneconomical or impractical. This conversion necesitates considerable alteration of the mechanical properties of snow; this study is concerned with these alterations. The problems of compacting snow for road, airstrip and building construction are examined.

MP 1058

METHODS OF MEASURING THE STRENGTH

MEJEHOUS OF MEASURING THE STRENGTH OF NATURAL AND PROCESSED SNOW.
Abele, G., Leningrad. Arkticheskii antarkticheskii nauchno-isaledovatel'akii institut. Trudy, 1975, Vol.326, p.176-186, In Russian. 14 refs. 20.3620. 30-3629

SNOW (CONSTRUCTION MATERIAL), ICE RUNWAYS, SNOW COMPACTION, SNOW ROADS, AIRPORTS, SNOW BEARING STRENGTH.

MP 1059

TECHNIQUES FOR USING LANDSAT IMAGE-RY WITHOUT REFERENCES TO STUDY SEA ICE DRIFT AND DEFORMATION.

Hibler, W.D., III, et al, Arctic lee Dynamics Joint Experiment. AIDJEX bulletin, Mar. 1976, No.31, p.115-135, 12 refs.
Tucker, W.B., Weeks, W.F.

30-3888

SEA ICE, DRIFT, ICE DEFORMATION, POSI-TION (LOCATION), LANDSAT.

TION (LOCATION), LANDSAT.

A semi-automatic procedure is described for transferring ice coordinates rapidly and accurately from one LANDSAT image to another and for simultaneously estimating all linear measures of the ice deformation. The procedure takes into account the non-parallel nature of the longitude lines and the finite curvature of the latitude lines, factors which are particularly critical in the polar regions. Necessary inputs are the location coordinates (latitude and longitude) of the center of each image and the location of two arbitrary points on a line of longitude on the image. These equations, which are valid over distances of several hundred kilometers, bypass the complex and time-consuming procedure of projecting points on the spheroid. After the transfer of common ice feature locations (on successive days) is completed, a least-squares program yields the average strain rate and vorticity, with the strain rate being independent of errors in the transfer of the coordinate system. Transfer, vorticity, and strain rate errors of the technique are described.

MP 1060 LABORATORY INVESTIGATION OF THE ME-CHANICS AND HYDRAULICS OF RIVER ICE JAMS.

Tatinclaux, J.C., et al, Iowa. University. Lee, C.L., Wang, T.P., Nakato, T., Kennedy, J.F. 30-4136 Iowa Insti-

ICE JAMS, RIVER ICE, ICE MECHANICS, HY-DRAULICS, COMPRESSIVE STRENGTH, ICE COVER THICKNESS, ICE FLOES, FLOW RATE, EXPERIMENTAL DATA.

MP 1061 ROSS ICE SHELF PROJECT DRILLING, OCTO-BER-DECEMBER 1976.

Rand, J.H., Antarctic journal of the United States, Oct. 1977, 12(4), p.150-152, 4 refs.

ICE SHELVES, ICE CORING DRILLS, DRILL-ING, ANTARCTICA—ROSS ICE SHELF.

ING, ANTARCTICA—ROSS ICE SHELF.

The wire line core drilling system used for the Ross Ice
Shelf Project and the problems encountered in using the
equipment are described. The proposed plans included
drilling four holes: the water well hole, Bern hole, core
hole, and access hole. The generally unsuccessful operations
during the season indicated that it is not feasible to drill
an open hole through the Ross Ice Shelf due to closure
of the drilled hole as a result of the flowing characteristics
of ice.

CONCENTRATED LOADS ON A FLOATING ICE SHEET.

Nevel, D.E., Journal of glaciology, 1977, 19(81), p.237-245, in English with French and German summaries. 8 refs.

32-2447 FLOATING ICE, ICE BEARING CAPACITY, TENSILE STRESS, ICE ELASTICITY, LOADS (FORCES), ICE COVER THICKNESS, MATHEMATICAL MODELS.

FORCES), ICE COVER INICANESS, MATHEMATICAL MODELS.

The safe bearing capacity of a floating ice sheet is usually determined by limiting the maximum tensile stress which occurs under the load at the bottom of the ice sheet. If the size of the load distribution is large compared to the ice thickness, the thin plate theory predicts these stresses correctly. However, if the size of the load distribution becomes small compared to the ice thickness, the plate theory overestimates the stresses. In this case the ice sheet should be treated as a three-dimensional elastic layer problem for loads distributed over a circular area, and have limited the results to the atress at the bottom of the ice sheet directly under the center of the load. In the present paper the stresses are evaluated at any radial position, and it is shown how these stresses approach those for the plate theory as the radial position becomes large. The solutions for the stresses are presented in integral form, as well as graphs from the numerical integration. These new results are significant for the superposition of stresses when two concentrated loads act near each other. Similarly for loads distributed over a rectangular area, the plate theory will overestimate the stresses if the dimensions of the load become small compared to the ice thickness. For this case integral solutions are presented for the stresses, and are evaluated directly under the center of the load. (Auth.)

PLEXURAL STRENGTH OF ICE ON TEMPER-ATE LAKES.

Gow, A.J., Journal of glaciology, 1977, 19(81), p.247-256, In English with French and German summaries. 7 refs. 32-2448

FLEXURAL STRENGTH, LAKE ICE, ICE CRYS-STRUCTURE, TENSILE STRESS, ICE CRACKS, TESTS.

Large, simply supported beams of temperate lake ice generally yield significantly higher flexural strengths than the same beams tested in the cantilever mode.

Data support the view that a significant stress concentration may exist at the fixed corners of the cantilever beams.

Maximum effects the fixed corners of the cantilever beams. Maximum effects are experienced with beams of cold, brittle ice substantially free of structural imperfections; the stress concentration factor may exceed 2.0 in this kind of ice. In ice that has undergone extensive thermal degradation the stress concentration effect may be eliminated entirely. Simply supported beams generally test stronger when the top surface is placed in tension. This behavior is attributed to differences in ice type; the fine-grained, crack-free top layer of snow-ice usually reacting more strongly in tension than the coarse-grained bottom lake ice which is prone to cracking. (Auth.)

DE-ICING OF RADOMES AND LOCK WALLS USING PNEUMATIC DEVICES.

Ackley, S.F., et al, Journal of glaciology, 1977, 19(81), p.467-478, In English with French and German sum-

maries. 1 ref. Itagaki, K., Frank, M.

ICE REMOVAL, PNEUMATIC EQUIPMENT, ICE DETECTION, ICE NAVIGATION.

ICE REMOVAL, PNEUMATIC EQUIPMENT, ICE DETECTION, ICE NAVIGATION.

A rough comparison between thermal and mechanical methods of de-icing indicates that mechanical methods could potentially de-ice with an order-of-magnitude less energy than that required to melt an ice accretion. Two applications of mechanical de-icing using pneumatically driven inflatable described in this report. The first of these was the de-icing of a small cylindrical radome used for air navigational purposes. Two seasons of testing were conducted with a de-icer consisting of an inflatable-deflatable flexible plastic covering. The de-icer was driven by tanks with a de-icer consisting of an inflatable-deflatable flexible plastic covering. The de-icer was driven by tanks with the de-icer consisting of an inflatable-deflatable flexible plastic covering. The selecting that were recharged by an on-site air compressor in response to a pressure sensor. The de-icing cycle was activated by an ice detector so the system responded to icing events on a demand basis driven by the ice detector. The system proved successful in keeping the radome free of ice without manned operation and with small energy consumption in a mountain icing environment. The second application was an attempt to de-ice the walls of locks used in river navigational facilities. Ice usually formed at the high-water-first by the freezing of the water exposed to low air temperatures or by the pressing of ice against the walls by alips using the locks. The de-icers consisted of air-driven hoses mounted on the wall covered by a thick flexible rubber mat and protected from ship damage by steel outer plates. This method was successful in removing ice accumulations up to 2 m long by 0.3 n thick over the area covered by the de-icer against abrasion by ships may make this de-icing method prohibitively expensive compared with meth-

ods which are not as susceptible to damage by ships (e.g., chemical coating and electrical heating cables buried in the walls).

MP 1065

ENGINEERING PROPERTIES OF SEA ICE Schwarz, J., et al, Journal of glaciology, 1977, 19(81), p.499-531, in English with French and German summaries. Refs. p.526-530. For this paper from another source see 31-2778.

Weeks, W.F. 32-2470

ICE SHELVES, ICE STRUCTURE, ICE MECHANICS, ICE FRICTION, ICE THERMAL PROPERTIES, ICE (CONSTRUCTION MATERIAL), ENGINEER-ING, SEA ICE, ICE STRENGTH.

ING, SEA ICE, ICE STRENGTH.

As the continental sherves of the Arctic become important as source areas for the oil and minerals required by human society, sea ice becomes an increasing challenge to engineers. The present paper starts with a consideration of the different fields of engineering which require information on sea ice with the tasks ranging from the design of ice-breaking ships to Arctic drilling platforms and man-made ice islands. Then the structure of sea ice is described as it influences the observed variations in physical properties. Next the status of our knowledge of the physical properties important to engineering is reviewed. Properties discussed include mechanical properties (compressive, tensile, shear and flexural strengths; dynamic and static elastic moduli; Poisson's ratio), friction and adhesion, thermal properties (specific and latent heats, thermal conductivity and diffusivity, density) and finally electromagnetic properties (dielectric permittivity and loss, resistivity). Particular attention is given to parameters such as temperature, strain-rate, brine volume, and loading direction as they affect property variations. Gaps, contradictions in the data, and inadequacies in testing techniques are pointed out. Pinally suggestions are made for future research, especially for more basic laboratory studies designed to provide the data base upon which further theoretical developments as well as field studies can be built. (Auth.)

MP 1066 STUDIES OF THE MOVEMENT OF COASTAL SEA ICE NEAR PRUDHOE BAY, ALASKA, U.S-

Weeks, W.F., et al, Journal of glaciology, 1977, 19(81), p.533-546, In English with French and German summaries. 5 refs. For this paper from another source see 31-2777.

Kovacs, A., Mock, S.J., Tucker, W.B., Hibler, W.D., III, Gow, A.J. 32-2471

FAST ICE, PACK ICE, ICE MECHANICS, THER-MAL EXPANSION, RADAR TRACKING, LASERS, SEA ICE, ICE CONDITIONS, UNITED STATES—ALASKA—PRUDHOE BAY.

ERS, SEA ICE, ICE CONDITIONS, UNITED STATES—ALASKA—PRUDHOE BAY.

During March-May 1976, a combination of laser and radar ranging systems was used to study the motion of both the fast ice and the pack ice near Narwahl and Cross Islands, two barrier islands located 16 and 21 km offshore in the vicinity of Prudhoe Bay, Alaska. Laser measurements of targets on the fast ice near Narwahl laland indicate small net displacements of approximately 1 m over the period of study (71 d) with short-term displacements of up to 40 cm occurring over 3 d periods. The main motion was outward normal to the coast and was believed to be the result of thermal expansion c? the ice. The radar records of fast-ice sites farther offshore show a systematic increase in the standard deviation of the displacements as measured parallel to the coast, reaching a value of 6.6 m at 31 km. The farthest fast-ice sites show short-term displacements of up to 12 m. There are also trends in the records that are believed to be the result of the general warming of the fast ice with time. Radar targets located on the pack ice showed large short-term displacements (up to 2.7 km) but negligible net ice drift along the coast. There was no significant correlation between the movement of the pack and the local wind, suggesting that coastal ice prediction models can only succeed if handled as part of a regional model which incorporates stress transfer through the pack. The apparent fast-ice-pack-ice boundary in the study are was located in 30-35 m of water. (Auth.)

MP 1067 SHORT-TERM FORECASTING OF WATER RUN-OFF FROM SNOW AND ICE. Colbeck, S.C., Journal of glaciology, 1977, 19(81), p.571-588, In English with French and German sum-maries. Refs. p.585-587. 32-2474

32-2474
RUNOFF FORECASTING, SNOW HYDROLOGY, ICE MELTING, SNOW MELTING, GLACIAL HYDROLOGY, MELTWATER, SNOW
COVER EFFECTS, MODELS.

COVER EFFECTS, MODELS.

Accurate forecasting of water run-off from snow covers and glaciers is increasingly important because of the increasing competition for scarce water resources. The trend toward conceptual computerized models of hydrologic systems requires extensive knowledge of the physical aspects of those systems. Unlike river and stream networks, the hydrological characteristics of snow covers and glaciers are highly variable with time and cannot be easily defined. After reviewing the physical aspects of water flow through snow covers and glaciers, it is concluded that snow covers and glaciers

are predictable hydrological systems once the melt metamorphism of the snow is complete and the englacial conduits have been established.

However, much additional information about snow and ice masses must be generated before general forecasting techniques can be established for all situations. (Auth.)

MP 1068

ROLE OF RESEARCH IN DEVELOPING SUR-FACE PROTECTION MEASURES FOR THE ARCTIC SLOPE OF ALASKA.

John on, P.R., Symposium on Surface Protection through Prevention of Damage (Surface Management). Focus: the Arctic Slope, Anchorage, Alaska, May 17-20, 1977. Proceedings. Edited by M.N. Bvans. Anchorage, Alaska, Bureau of Land Management, Mar. 1978, p.202-205. 32-2648

ENVIRONMENTAL PROTECTION, SNOW AC CUMULATION, SNOW (CONSTRUCTION MATERIAL), ICE (CONSTRUCTION MATERIAL), CIVIL ENGINEERING, U.S. ARMY CRREL, RESEARCH PROJECTS, ALASKA—NORTH SLOPE. UNITED STATES

The U.S. Army Cold Regions Research and Engineering Laboratory (USA CRREL) has long conducted research in snow, ice, and permatrost. It also translates foreign language engineering papers and publishes research reports, monographs, and bibliographies. Snow and ice roads and construction sand bibliographies. Sand so wand ice roads and construction pads have been used, primarily on the Arctic Slope, during the last few winters. Some have been used, charing the last few winters. Some have been used, during the last few winters. Some have been successful but problems exist which will require further experience and research to solve. One problem is that of snow supply. Snowfall on the Arctic Slope is limited, particularly early in the season when it is most desired. Few good data are available on total quantities and the time pattern of snowfall but Wyoming Snow Gages, now being installed by a number of government agencies and private organizations, are beginning to provide some data which can be used with some confidence. The snow which falls is often blown off by the strong winds which are common in the area so it is not available where it is needed. Research is under way on equipment and techniques for collecting snow and inducing drifting.

MP 1069

INTEGRATED APPROACH TO THE REMOTE

SENSING OF FLOATING ICE.
Campbell, W.J., et al, International Astronautical Congress, 26th, Lisbon, September 21-27, 1975. Proceedings. Edited by L.G. Napolitano, Oxford, Pergamon Press, 1977, p.445-487, Refs. p.483-487.
Ramseier, R.O., Weeks, W.F., Gloersen, P. 32-2840

FLOATING ICE, REMOTE SENSING, SENSOR MAPPING, AERIAL RECONNAISSANCE, SEASONAL VARIATIONS.

SONAL VARIATIONS.

The current increase of scientific interest in all forms of floating ico-sea ice, lake ice, river ice, ice abelves and icebergs—has occurred during a time of rapid evolution of both remote-sensing platforms and sensors. The application of these new research tools to ice studies in the Arctic and Antarctic has generally been both piecemeel and sporadic, partly because the community of ice scientists has not kept up with the rapid advances in remote sensing technology and partly because they have not made their needs known to the space community.

This paper seeks to help remody the latter shortcoming. The remote sensing requirements for floating ice studies are given, and the capabilities of various existing and future sensors and sensor combinations in meeting these requirements are discussed. The desirable future sensors are also discussed from both the research and operational points of view.

DYNAMICS OF SNOW AVALANCHES.

Mellor, M., Rockslides and avalanches, 1. Natural phenomena. Edited by B. Voight, New York, Elsevier, 1978, p.753-792, 22 refs.

32-2937

AVALANCHE MECHANICS, SNOW COVER STABILITY, SHEAR STRAIN, AVALANCHE

WIND.

After a general introduction to snow avalanches and their consequences, type classification is discussed, and classification schemes are described briefly. The first technical section deals with deformation and displacement of snow slopes prior to avalanche release, with the failure process, and with the propagation of initial failure. The following section describes various types of avalanche motion after release. Representative values are suggested for slope angles, initial accelerations, flow density, driving stresses, and travel velocities. The third technical section considers idealized theoretical analyses of avalanche motion. The final technical section covers the dynamic forces imposed by snow avalanches and their associated "winds." Measured values of impact stresses are summarized, and direct impact stresses for "wide" avalanches are deduced from simple theory. Porces induced by interfacial shear and avalanche deflection are considered by interfacial shear and avalanche deflection are considered by interfacial shear and avalanche winds, or "air blast," are discussed. In the conclusion there is a simplified tabulation of representative values for stress ranges, typical strain rates and typical velocities in the various avalanche processes.

IN-SITU MEASUREMENTS ON THE CONDUC-TIVITY AND SURFACE IMPEDANCE OF SEA-ICE AT VLF PREQUENCIES.

McNeill, D., et al. Copenhagen. Polyteknisk laerean-stalt. Laboratoriet for elektromagnetisk feltteori. Report, Dec. 1971, R105, 19p. plus diagrams, 9 refs. Also published in Radio science, Jan. 1973, 8(1):23-30. Hoekstra, P.

ICE, ICE RESISTIVITY, ELECTRICAL SEA RESISTIVITY.

RESISTIVITY.

An experimental program to measure in-situ values of the electrical conductivity and surface impedance of sea ice at VLF frequencies was carried out at Pt. Barrow, Alaska. Temperature, salinity, and resistivity were measured as a function of depth in the ice for both first year and multi-year sea ice by means of cored samples. All three quantities varied with the age of the ice and, in addition, the resistivity varied with age from 100 to 10,000 ohm-meters at the sea water interface. The wave tilt of a VLF plane wave propagating over sea ice is theoretically linearly dependent on the thickness. Measurements of the quadrature phase wave tilt at 18.6 KHz give values of the right order of magnitude but erratic in local behavior. Short-spacing Wenner array resistivity measurements and telluric current measurements at VLF demonstrated that the erratic behavior was due to significant horizontal variations of the aea ice resistivity over distances of a few feet.

MP 1672

MP 1072 UV RADIATIONAL EFFECTS ON: MARTIAN

REGOLITH WATER.
Nadesu, P.H., Hanover, New Hampshire, Dartmouth
College, Aug. 1977, 89p., M.A. thesis. Refs. p.66-89.

32-2972
MARS (PLANET), SOIL CHEMISTRY, CHEMICAL REACTIONS, ENVIRONMENTS, HYDROGEN PEROXIDE, SOLAR RADIATION, ULTRAVIOLET RADIATION, ECOLOGY, ENVIRONMENT SIMULATION.

MP 1073

DYNAMICS OF NEAR-SHORE ICE.

Kovacs, A., et al. Environmental assessment of the Alaskan continental shelf. Vol.XVI. Hazards. Prin-cipal investigators' reports for the year ending March 1977. Boulder, Colorado, Environmental Research Laboratories, 1977, p.151-163. Weeks, W.F. 32-3067

SEA ICE, DRIFT, ICE DEFORMATION, LASERS.

MP 1074

DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAFROST BENEATH THE BEAUFORT SEA. Sellmann, P.V., et al, Environmental assessment of the

Seumann, r.v., et al, Environmental assessment of the Alaskan continental shelf. Vol.XVI. Hazards. Principal investigators' reports for the year ending March 1977. Boulder, Colorado, Environmental Research Laboratories, 1977, p.385-395.
Blouin, S.E., Brown, J., Chamberlain, E.J., Iskandar, I.K., Ueda, H.T.

SUBSEA PERMAFROST, PERMAFROST PHY-SICS, PERMAFROST DISTRIBUTION, ENGI-NEERING.

The overall objectives of the CRREL participation in the subsea permatrost program are to quantify the engineering characteristics and sacertain the distribution of permatrost beneath the Beautort Sea and to determine their relationship beneath the Beaufort Sea and to determine their relationship to temperature, sediment type, ice content and chemical composition. Permafrost was present in the four boles drilled at Prudhoe Bay. Ice-bonded permafrost was absent in the upper 30 meters of sediment up to 17 kilometers from shore. Based on negative temperature gradients and pore water chemistry, ice-bonded permafrost should be encountered at 30- and 43-meter depths at sites PB-2 and PB-3, respectively. It appears that the depth to the ice-bonded permafrost decreases with increasing distance from shore and depth of water. Highly over-consolidated marine clays were encountered seaward of Reindeer Island. The overconsolidation probably resulted from the freeze-thaw history. The presence of these stiff, marine clay deposits is an important consideration for stiing structures associated with offshore developments.

MP 1075

ROSS ICE SHELF PROJECT ENVIRONMEN-TAL IMPACT STATEMENT JULY, 1974.

Parker, B.C., et al, Environmental impact in Antarctica, edited by B.C. Parker, Blacksburg, Virginia Polytechnic Institute and State University, 1978, p.7-36, 13

McWhinnie, M.A., Elliott, D., Reed, S.C., Rutford, RH

32-3113

ENVIRONMENTAL IMPACT, ICE SHELVES, DRILLING, RESEARCH PROJECTS, ANIARC-TICA—ROSS ICE SHELF.

The acientific objectives of the Ross Ice Shelf Project (RISP) are to drill into the ice shelf to investigate the physical, chemical, biological, and geological conditions in the ice shelf, the water mass beneath the ice, and the soft sediments and bedrock at the bottom of the sea, and to use the data obtained for interpretation of the present conditions and the history of this portion of Antarctica. This environmental impact assessment describes the proposed action, summarizes the scientific studies to be undertaken, and outlines remedial and protective measures, unavoidable adverse impacts, and alternatives to the proposed action. It is anticipated that the majority of the impacts will be abort-term and extremely localized, such as those associated with the camp and laboratory facility on the Ross Ice Shelf during the period of drilling. These impacts will be monitored throughout the RISP operations. The pristine nature of the surface should be restored fully within one year. It is stressed that the likelihood of penetrating a hydrocarbon trap is remote, but should this occur rendering an uncontrollable release of hydrocarbons, the impact on the environment could be quite severe. On a scale of 1 to 10 this possibility is assigned a value of 5.

DYNAMICS OF NEAR-SHORE ICE.

Kovacs, A., et al, Environmental assessment of the Alaskan continental shelf. Vol.II. Principal investigators' quarterly reports for the period April-June 1977. Boulder, Colorado, Environmental Research Laboratories, 1977, p.411-424.

SEA ICE. ICE MECHANICS, FAST ICE, ICE STRUCTURE.

DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAPROST BENEATH THE BEAUFORT SEA.

BEAUFURT SEA.
Sellmann, P.V., et al, Environmental assessment of the Alsakan continental shelf. Vol.II. Principal investigators' quarterly reports for the period April-June 1977. Boulder, Colorado, Environmental Research Laboratories, 1977, p.432-440.
Brown, J., Blouin, S.E., Chamberlain, E.J., Iskandar, I.K., Ueda, H.T.

32-3189

SUBSEA PERMAFROST, OFFSHORE DRILL-ING, ICE COVER THICKNESS, DRILL CORE ANALYSIS, CHEMICAL ANALYSIS.

MP 1078 GROUTING SILT AND SAND AT LOW TEM-PERATURES.

Johnson, R., Conference on Applied Techniques for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol.2, New York, American Society of Civil Engineers, 1979, p.937-950, 2 refs.

GROUTING, VISCOSITY, SOIL STABILIZA-TION, PROZEN GROUND MECHANICS, SANDS, STRESS STRAIN DIAGRAMS, COM-PRESSIVE STRENGTH, TEMPERATURE EF-FECTS, COLD WEATHER OPERATION. RES-INS. TESTS

MP 1079 INTERHEMISPHERIC COMPARISON OF CHANGES IN THE COMPOSITION OF ATMO-SPHERIC PRECIPITATION DURING THE LATE CENOZOIC ERA.

Cragin, J.H., et al, Polar oceans. Proceedings of the Polar Oceans Conference, Montreal, May 1974. Edited by M.J. Dumbar, Montreal, Arctic Institute of North America, 1977, p.617-631, 26 refs. Includes

Herron, M.M., Langway, C.C., Jr., Klouda, G.A. 32-3432

GLACIER ICE, ICE SHEETS, ICE COMPOSITION, PRECIPITATION (METEOROLOGY), TION, PRECIPITA DUST, ICE CORES.

DUST, ICE CORES.

Concentrations of alkali and alkaline earth elements in north Greenland glacial ice deposited during the past 100,000 years show marked variations over that time span. Prior to the Wisconsin Stage concentrations of Na, K, Mg and Ca sverage 36, 44, 6.3, and 18 microg/l respectively. Concentration levels rise gradually at the beginning of the Wisconsin Stage and peak at averages of 51, 29, 25, and 5.1 microg/l. Silicon concentrations increase by about a factor of 3 (over Sangamon levels of 100 microg/l) during the late Wisconsin Stage, indicating a significant influx of colian dust at that time. Although sulfate concentrations are high (280 microg/l) during the late third of the Wisconsin Stage, they remain relatively constant (100 microg/l) prior to and after that time; this might suggest that the Wisconsin Stage was not triggered by volcanism. Similar elemental concentrations measured in West Antarctic glacial ice deposited easential ly over the same time period as the Greenland material also increase during the late Wisconsin Stage, but to a much smaller extent than those in Greenland ice. (Auth.)

MP 1080

EFFECT OF FREEZING AND THAWING ON THE PERMEABILITY AND STRUCTURE OF SOILS.

Chamberlain, E.J., et al, International Symposium on Ground Freezing, 1st, Bochurr, Germany, March 8-10, 1978. Proceedings. Edited by H.L. Jessberger, Bochum, Ruhr University, 1978, p.31-44, 11 refs. Gow. A.J.

PREEZE THAW CYCLES, SOIL WATER MIGRATION, PERMEABILITY, SOIL STRUCTURE, SOIL PHYSICS, SOIL TEXTURE, FINES, PARTI-CLE SIZE DISTRIBUTION.

CLE SIZE DISTRIBUTION.

The permeability and structure of four fine-grained soils were observed to be changed by freezing and thawing. In all cases freezing and thawing caused a reduction in void ratio and an increase in vertical permeability. The increase in permeability is attributed to the formation of polygonal shrinkage cracks and/or to the reduction of the volume of fines in the porces depending on material type. No definite relationships are established; however, it appears that the largest increase in permeability occurs for the soil of highest plasticity. of highest plasticity.

MP 1081

SEGREGATION FREEZING AS THE CAUSE OF SUCTION FORCE FOR ICE LENS FORMA-

Takagi, S., International Symposium on Ground Preezing, 1st, Bochum, Germany, March 8-10, 1978. Proceedings. Edited by H.L. Jessberger, Bochum, Ruhr University, 1978, p.45-51, 20 refs 32-3470

SOIL FREEZING, GROUND ICE, ICE LENSES, SOIL WATER MIGRATION, FROST HEAVE, PROZEN GROUND THERMODYNAMICS, SOIL STRUCTURE, SOIL PRESSURE, ANALYSIS (MATHEMATICS).

(MATHEMATICS).

A new freezing mechanism, called segregation freezing is proposed to explain the generation of the suction force that draws pore water up to the freezing surface of a growing ice lens. The segregation freezing temperature is derived by applying thermodynamics to a soil mechanics concept that distinguishes the mechanically effective pressure from the mechanically neutral pressure. The frost-heaving procedure is formulated as part of the solution of the differential equations of the simultaneous flow of heat and water, of which the segregation freezing temperature is one of the boundary conditions.

EFFECT OF FREEZE-THAW CYCLES ON RESILIENT PROPERTIES OF FINE-GRAINED

Johnson, T.C., et al, U.S. Army Cold Regions Research and Engineering Laboratory, [1978], 19p., Prepared for International Symposium on Ground Freezing, Bochum, Germany, March 8-10, 1978. 20 refs.

Cole, D.M., Chamberlain, E.J.

32-3502
PROZEN GROUND MECHANICS, FREEZE
THAW CYCLES, PAVEMENT BASES, BEARING
TESTS, SHEAR STRESS, SUBGRADE SOILS,
LOADS (FORCES), SOIL MOISTURE CONTENT,
SOIL TEMPERATURE, MODELS. 32-3502

SOIL TEMPERATURE, MODELS.

Stress-deformation data for silt and clay subgrade soils were obtained from in-situ tests and laboratory tests, for use in mechanistic models for design of pavements that will experience freezing and thawing. Plate-bearing tests were run on in-service all-bituminous-concrete (ABC) pavements constructed directly on silt subgrade, and on an experimental ABC pavement constructed on clay subgrade, applying repeated loads to the pavement surfaces while the subgrade was frozen, thawing, thawed, and fully recovered. Analysis of deflection data from the in-situ tests showed resilient modulis of the subgrade soils up to more than 10 GPa when frozen, as low as 2 MPa during the thawing period, and up to more than 100 MPa when fully recovered. Analysis of the laboratory tests, which gave moduli comparable to the latter values, showed that resilient modulus and Poisson's ratio in the thawed and recovering conditions can be expressed as a function of the stress rate, the moisture content, and the dry density.

MP 1083

TEMPERATURE EFFECTS IN COMPACTING AN ASPHALT CONCRETE OVERLAY.

for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol.1, New York, American Society of Civil Engineers, 1978, p.146-158, 9 refs. Berg, R.L. 32-3608

BITUMINOUS CONCRETES, COMPACTING, DENSITY (MASS/VOLUME), TEMPERATURE EFFECTS, COOLING RATE.

An asphalt concrete overlay was constructed at the U.S. Army Cold Regions Research and Engineering Laboratory

(CRRBL), Hanover, New Hampshire, in November, 1976, to evaluate temperature and other environmental effects upon compaction. Four overlay sections each 100 ft x 12 ft x 1-1/2 in. thick were designed to be placed on an existing CRRBL test road. The asphalt cement and aggregate used were to have mix characteristics as close to the Thule mix as possible. This paper presents results of the test overlay using an AC 2.5 in a cold environment.

MP 1084

KOTZEBUE HOSPITAL—A CASE STUDY.

Crory, F.E., Conference on Applied Techniques for Environments, Anchorage, Alaska, May 17-19, B. Proceedings, Vol.1, New York, American So-of Civil Engineers, 1978, p.342-359, 10 refs.

BUILDINGS, SETTLEMENT (STRUCTURAL), PERMAFROST BENEATH STRUCTURES, FOUNDATIONS, SOIL TEMPERATURE.

FOUNDATIONS, SOIL TEMPERATURE.
Construction of the hospital was started in late 1959 and completed in September 1961. The hospital is a single-story structure, supported on insulated perimeter wall footings, with intermediate footings for the support of roof columns and grade beams. All floors are slab-on-grade concrete. Wall cracking was in evidence in the first year of occupancy. A void of more than a foot was found between the floor slab and the gravel fill in August, 1963. At the request of the U.S. Public Health Service, USA CREEL conducted soil explorations and installed ground temperature assemblies and vertical movement points within the building and around the perimeter of the foundation distress. The performance of the hospital through 1976 clearly indicates the settlement associated with the thawing of the underlying permafrost with time. Soil and permafrost conditions in the village of Kotzebue are described in light of the conditions disclosed in the hospital ares.

MP 1085

MP 1085
EFFECTS OF MOISTURE AND FREEZE-THAW
ON RIGID THERMAL INSULATIONS: A
LABORATORY INVESTIGATION.

Kaplar, C.W., Conference on Applied Techniques for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol.1, New York, American Society of Civil Engineers, 1978, p.403-417, 13 refs. 32, 1628

THERMAL INSULATION, ABSOMOISTURE, FREEZE THAW TESTS. ABSORPTIVITY.

MOISTURE, FREEZE THAW TESTS.

Laboratory observations on the effects of moisture absorption and freeze-thaw on various thermal insulation boards commonly used in construction beneath slabs on grade, in roofs, and in perimeter insulation of foundations were made under the too distinctions. Test specimens were submerged in water and buried in moist soil for periods ranging up to 36 months. Selected soaked specimens submerged in water were subjected to 15 and 30 freeze-thaw cycles. The study showed that:

1) None of the materials was completely resistant to moisture absorption under all test conditions; 2) A number of extruded polystyrene boards were more absorbent than the extruded polystyrene boards were more absorbent than the extruded types; and 4) Alternate freezing and thawing of rigid insulation in presence of free water was either destructive or increased moisture absorption in most of the tested materials; and 5) Cellular glass, normally highly moisture resistant in soaking moisture assorption in most of the tested materials; and 5) Cellular glass, normally highly moisture resistant in soaking tests, suffered extremely severe deterioration in freeze-thaw tests. This study clearly demonstrated that only highly moisture-resistant rigid thermal insulations should be used under conditions subject to free water and alternate freezing

DESIGN CONSIDERATIONS FOR AIRFIELDS IN NPRA.

Crory, F.E., et al, Conference on Applied Techniques for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol.1, New York, American Society of Civil Engineers, 1978, p.441-458, 6 refs. Berg, R.L., Burns, C.D., Kachadoorian, R. 32-3631

AIRCRAFT LANDING AREAS, FROZEN SAND, FROZEN GRAVEL, PETROLEUM INDUSTRY.

FROZEN GRAVEL, PETROLEUM INDUSTRY.
Two exploratory wells, at Inidgok and Tunalik, will be spudded in the spring of 1978. The well sites require airfields for Hercules aircraft during the entire drilling operation. Design and construction problems for the two airfields are compounded by the constraint that they be built in winter and in accordance with environmental requirements which necessitate that all fill and gravel be transported over snow roads. Laboratory studies conducted at USACREL showed that fills of frozen sitly sand, the only locally available borrow at Inigok, have a greater potential for settlement upon thawing than the in-situ sands in cut sections. Several design options were considered for the airfields, drill pads and short connecting roads which must be usable all year. These included (1) gravel over sand, (2) gravel over insulation on sand, (3) landing mat with insulation, and (4) landing mat without insulation. Some of these concepts were evaluated at USAEWES, using large-scale test sections. In conjunction with the airfields, additional test sections are planned to evaluate different design concepts for runways, drill pads and roads to be built for the 1979 drilling program. This paper describes studies associated with the lnigok airfield.

MP 1087

EFFECTS OF SUBGRADE PREPARATION UPON FULL DEPTH PAVEMENT PERFORMANCE IN COLD REGIONS.

Zaton, R.A., Conference on Applied Techniques for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol.1, New York, American Society of Civil Engineers, 1978, p.459-473, 8 refs. 32-3632

BITUMINOUS CONCRETES, COLD WEATHER PERFORMANCE, SUBGRADE PREPARATION, FROST HEAVE.

FROST HEAVE.

In September, 1973, a "full-depth" road test section was constructed at the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), Hanover, New Hampshire. Due to weather and time constraints, the subgrade beneath the asphalt concrete pavement was not properly prepared (blended, mixed, and made as uniform as possible). The road is in a cut area on an 8% alope and intersects horizontal layers of varved silts, silty sands, and sandy materials which are highly frost susceptible. The first winter, surface differential heaves of up to 5 inches in 5 feet occurred. The following summer, the subgrade was removed for 100 feet to a depth of 24 inches and 100 feet to a depth of 12 inches. The material was mixed, blended, and dried before placing back into the roadway in 6-inch compacted lifts. The succeeding two winters' performance has shown very marked improvement with relatively uniform heaving of the pavement surface. This shows, in conjunction with other CRREL highway pavement test sections, the importance of proper subgrade preparation for pavements in cold regions over frost-susceptible soils.

MP 1088
STORM DRAINAGE DESIGN CONSIDERA-TIONS IN COLD REGIONS.

Lobacz, E.F., et al, Conference on Applied Techniques for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol.1, New York, American Society of Civil Engineers, 1978, p.474-489, 12 refs.

DRAINAGE, AIRCRAFT LANDING AREAS, ICE CONTROL, COLD WEATHER OPERATION.

CONTROL, COLD WEATHER OPERATION.

This paper, based on the authors' recently revised design manual for drainage facilities at Army and Air Force airfields and heliports, adapts previously used U.S. hydraulic design criteria to the special conditions prevailing in arctic and subarctic regions. Design runoff supply rates for surface drainage are derived from rainfall plus snowmelt minus infiltration, three factors for which typical values are given, for both permafrost and unfrozen ground situations. Guidelines are discussed for other drainage design requirements such as structural, durability, maintenance, and, of major significance in cold regions, environmental impact considerations and debris and icing control. Because of the importance of control and prevention of icings in and near drainage structures, applicable principles formulated by CRREL and other researchers are enunciated. While primarily intended for design of storm drain pipes, appurtenances and open drainage ditches serving airfields and heliports, the principles outlined are also generally suitable for culverts and drainage for facilities such as roadways, parking lots, and built-up areas in the Arctic and Subarctic.

TECHNIQUES FOR USING MESL (MEMBRANE ENCAPSULATED SOIL LAYERS) IN ROADS AND AIRFIELDS IN COLD REGIONS Smith, N., Conference on Applied Techniques for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol. 1, New York, American Society of Civil Engineers, 1978, p.560-570, 19 refs. 32-3640

SOIL TEXTURE, SOIL WATER, SOIL COMPACTION, WATERPROOFING, LAYERS.

TION, WATERPROOFING, LAYERS.

Membrane encapsulation of fine-grained soils to prevent soil moisture intrusion can provide an option to the use of more expensive select granular soils as structural layers in roads and airfields, even in cold regions. Silts and clays compacted at, or slightly below, optimum moisture contents can provide high bearing strengths and are not subject to moisture migration or detrimental frost heaving during closed system (membrane encapsulated) freezing. Central Alaska has an abundant supply of silts, and the semi-arid climate is ideal for air-drying those that have an in-situ moisture content above optimum. In other areas it might not be economically or technically feasible to dry the soils to the required moisture content for encapsulation unless granular soils are extremely scarce.

WATER RESOURCES BY SATELLITE.

McKim, H.L., Military engineer, May-June 1978, 70(455), p.164-169. 32-3654

REMOTE SENSING, SPACEBORNE PHOTOGRAPHY, WATER SUPPLY, SNOW COVER, ICE COVER, MAPPING.

MP 1091 MASS TRANSFER ALONG ICE SURFACES OB-SERVED BY A GROOVE RELAXATION TECH-

NIOUE.

Tobin, T.M., et al, International Association of Hydrological Sciences. Publication, 1977, No.118, International Symposium on Isotopes and Impurities in Snow and Ice, Grenoble, Aug. 28-30, 1975, p.34-37, In English with French summary. 6 refs. Itagaki, K.

MASS TRANSFER, ARTIFICIAL ICE, DEUTERI-UM OXIDE ICE, RELAXATION (MECHANICS). OM DAIDE ICE, RELAXATION (MECHANICS).
The mass transfer coefficients were measured using a groove decay technique on the (0001) planes of naturally and artificially grown H2O ice and artificially grown D2O ice at 10C. In each case a viscous flow term contributed the most to groove decay in the longest wavelengths measured, while an evaporation-condensation term predominated in the shortest wavelengths measured. All other terms were found to be negligible. Large discrepancies between the decay. to be negligible. Large discrepancies between the decay constants obtained from measurements and the constants calculated from theory indicate that other mechanisms not considered in Mullins' theory may be responsible for the

MP 1092
VANADIUM AND OTHER ELEMENTS IN
GREENLAND ICE CORES.

rierron, M.M., et al, International Association of Hydrological Sciences. Publication, 1977, No.118, International Symposium on Isotopes and Impurities in Snow and Ice, Grenoble, Aug. 28-30, 1975, p.88-102, In English with French summary. 16 refs. Langway, C.C., Jr., Weiss, H.V., Hurley, J.P., Kerr, R., Cragin, J.H.
32-3817 Herron, M.M., et al, International Association of Hy-

ICE COMPOSITION, CHEMICAL ANALYSIS, ICE CORES, GREENLAND.

ICE CORES, GREENLAND.
Chemical analysis for Na, Cl, Al, Mn and V of surface snows and deeper ice core samples from station Milcent, Greenland, indicates a terrestrial or marine origin for these constituents. Pre-1900 enrichment factors, based on average crustal composition, are high for Zn and Hg and appear to be related to the volatility of these elements. A comparison of pre-1900 and 1971-1973 concentrations of V and Hg shows no decided increase due to industrial production, yet the relative abundance of Zn increased from 12 to 32 over this time period. The chemical composition of ancient ice is extremely useful in interpreting modern aerosols.

TRACER MOVEMENT THROUGH SNOW.

Colbeck, S.C., International Association of Hydrological Sciences. Publication, 1977, No. 118, International Symposium on Isotopes and Impurities in Snow and Ice, Grenoble, Aug. 28-30, 1975, p.255-262, In English with French summary. 19 refs. 32-3840

SNOW COMPOSITION, MOISTURE TRANSFER. IMPURITIES.

Impurities flowing with water through snow undergo hydrody-namic dispersion. Solutions describing the distribution of impurities are hard to obtain for realistic boundary conditions. The movement of impurities in snow is approximated here by neglecting second-order effects on their movement.

SEASONAL VARIATIONS OF CHEMICAL CONSTITUENTS IN ANNUAL LAYERS OF GREENLAND DEEP ICE DEPOSITS.

GREENLAND DEEP ICE DEPOSITS.

Langway, C.C., Jr., et al, International Association of Hydrological Sciences. Publication, 1977, No.118, International Symposium on Isotopes and Impurities in Snow and Ice, Grenoble, A 28-30, 1975, p. 302-306, In English with French s. mary. 13 refs. Klouda, G.A., Herron, M.M., Cragin, J.H. 32-3846

ICE CORES, CHEMICAL ANALYSIS, SEASON-AL VARIATIONS, ICE DATING.

AL VARIATIONS, ICE DATING.
Chemical analysis of century-old ice from continuous 5-year intervals of three ice cores obtained from south and central Greenland (Dye 3, Milcent and Crête) shows maximum concentrations of Na, Mg, Ca, K and Al during early spring and minimum concentrations during late summer and early fall. Peak spring values are as much as 10 times greater than fall values. Becaue of the large seasonal chemical variations, sam pless used for depth-age or annual deposition rate studies must represent exactly one (or multiple) year's accumulation. The seasonal chemical variations seem promising as a new method of defining annual layers and thus dating old ice cores.

STABLE ISOTOPE PROFILE THROUGH THE ROSS ICE SHELF AT LITTLE AMERICA V, AN-TARCTICA.

Dansgaard, W., et al, International Association of Hy dralogical Sciences. Publication, 1977, No.118, International Symposium on Isotopes and Impurities in Snow and Ice, Grenoble, Aug. 28-30, 1975, p.322-325, In English with French summary. 9 refs.
Johnsen, S.J., Clausen, H.B., Hammer, C.U., Langway,

C.C., Jr. 32-3849

ICE SHELVES, ICE DATING, ICE COMPOSITION, ISOTOPE ANALYSIS, ANTARCTICA—ROSS ICE SHELF.

The delta (0-18)-profile along the Little America V ice core ranges from -20 per mille near the surface to -35 per mille at the bottom, i.e., lower than at any surface value hitherto measured in West Antarctica. (Auth.)

THERMAL PROPERTIES AND REGIME OF WET TUNDRA SOILS AT BARROW, ALASKA.

McGaw, R., et al, International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.47-53, With Russian and French summaries. 12 refs. Outcalt, S.I., Ng, E.

32-3670

TUNDRA SOILS, THERMAL CONDUCTIVITY, TUNDRA VEGETATION, SOIL TEMPERA-TURE, TEMPERATURE MEASUREMENT.

TURE, TEMPERATURE MEASUREMENT.

Measurements of temperature and of thermal conductivity for two summer periods were carried out on wet organic surface materials and underlying mineral soils at Barrow, Alaska. Precise temperatures were measured by means of calibrated thermistors placed at accurately known depths, from which temperature gradients to a depth of 1.0 m are calculated. Thermal conductivities were measured by the transient-heating probe method, both in-situ and in the laboratory. The observed conductivity of the organic layer was between that of moist sir (0.1 W/mK) and that of water (0.6 W/mK); the conductivity of the silt soil depended on the state of freezing. The measured data are combined to calculate summer heat fluxes to a depth of 1.0 m, from which the thermal transition of the active layer from initial thawing to incipient freezing is described and analyzed.

MP 1097

MP 1097 DETERMINATION OF UNFROZEN WATER IN FROZEN SOIL BY PULSED NUCLEAR MAG-NETIC RESONANCE.

Tice, A.R., et al, International Conference on rema-frost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Re-search Council of Canada, 1978, p. 149-155, With Rus-sian and French summaries. 12 refs. Tice, A.R., et al. International Conference on Perma Burrous, C.M., Anderson, D.M. 32-3685

FROZEN GROUND, GROUND ICE, UNFROZEN WATER CONTENT, MEASURING INSTRU-

Pulsed nuclear mag. etic resonance (NMR) techniques have been developed and utilized to determine complete phase composition curves for three soils. This promising new technique offers a non-destructive method for measurements of unfrozen water contents in frozen soils from -0.2C through -23C. The results show that unfrozen water contents determined by this technique depend upon ice content (i.e. total water content). These results are content to the soil of total water content). These results are contrary to earlier assumptions based on results which indicated that unfrozen water contents are a function of temperature only. These findings show great promise in the discrimination of unfrozen water associated with mineral grain boundaries and the ice-water interfaces of the poly-crystalline ices present in soil-

MP 1098

GEOECOLOGICAL MAPPING SCHEME FOR ALASKAN COASTAL TUNDRA.

Everett, K.R., et al, International Conference on Permafrost, R.R., et al, international Conference on Fer-mafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Re-search Council of Canada, 1978, p.359-365, With Rus-sian and French summaries. 8 refs.

TUNDRA, MAPPING, CHARTS, VEGETATION PATTERNS, TUNDRA SOILS, UNITED STATES

ALASKA.

A unified geoecological mapping system has been developed for northern Alaska which recognizes in a given area a suite of landforms whose geomorphic elements control the composition and distribution of vegetation and soil. Within each landform boundary a fractional code is displayed in which the numerator consists of the geomorphic feature and its characteristic vegetation stand presented as a series of alpha-numeric units. The denominator is comprised of three elements: the soil(s), the landform type and its mean slope. Bach map contains an annotated list of code symbols and is accompanied by a text in which the characteristics of the code components are discussed. The advantages

of such a mapping technique include: (1) integrating on a single base a large body of diverse data into a relatively few easily detected environment units; (2) the derivation of any number of special purpose maps by selecting components of the code and/or related analytical data; (3) permitting an expansion of the code to include other kinds of geotechnical us environmental data.

MP 1000 CLIMATIC AND DENDROCLIMATIC INDICES IN THE DISCONTINUOUS PERMAPROST ZONE OF THE CENTRAL ALASKAN UPLANDS. Haugen, R.K., et al, International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.392-398, With Russian and French summaries. 17 refs.

Brown, J. 32-3722

32-3722
PERMAPROST DISTRIBUTION, DISCONTINUOUS PERMAPROST, ALPINE TUNDRA, TUNDRA VEGETATION, FOREST TUNDRA, PLANT
ECOLOGY, CLIMATIC FACTORS, UNITED
STATES—ALASKA—CENTRAL ALASKAN UP-LANDS

Most climatic records from central Alaska represent lowland Most climatic records from central Alaska represent lowland sites. Consequently, continuous climatic observations were initiated in 1970 at four sites (750-1150 m elevation) 160 km north of Fairbanks near Eagle Summit, at one site (760 m) to km east of Livengood, and at one site (1040 m) on the northern flank of Mt. Fairplay. Mean annual temperatures at these upland sites range from -8.1 to -6.4C, as compared to -3.5C at Fairbanks for the same period of record. The site data characterize air temperatures and permatical conditions for several different alrice turdes. and permafrost conditions for several different alpin and forested settings. Based upon correlations of radial growth of timberline white spruce and June-July temperatures, dedroclimatic patterns of warm and cool growing seasons are documented over the past 300 years for the Yukon-Tanana Uplands. Similar timberline tree growth patterns are found south to the Alaska Range and at the white spruce timberline in the southern foothills of the Brooks Range, suggesting a relative uniformity of summer temperature out central Alask

BIOLOGICAL RESTORATION STRATEGIES IN RELATION TO NUTRIENTS AT A SUBARCTIC SITE IN FAIRBANES, ALASKA.

Johnson, L.A., International Conference on Perma Johnson, L.A., International Conference on Perma-froat, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Re-search Council of Canada, 1978, p.460-466, With Rus-sian and French summaries. 9 refs. 32-3732

SUBARCTIC LANDSCAPES, ARCTIC LAND-SCAPES, ENVIRONMENTAL PROTECTION, REVEGETATION, UNITED STATES—ALASKA

Restoration needs in the far north have dramatically increas the extent of surface disturbance has increased over as the extent of surface disturbance has increased over the last decade. The urgency of arctic and subarctic revegetation and restoration has prompted the use of technology developed in the temperate zones, at least some of which may ultimately be suitable in these colder regions. A randomized block design was established in 1975 on the Chena Flood Control Project in order to test the effect of nutrient applications upon the competitive relationships between arctared fescue, bluejoint reedgrass, and annual rye. Data gathered over two growing seasons on biomasa, cover, maximum height, nutrient content, and other pertinent parameters are used to predict the effects of nutrient manipulation upon long-term restoration goals. It is anticipated that this research will increase the options available for successful mitigation of impact from northern industrial development. of impact from northern industrial development

MP 1101 SHALLOW ELECTROMAGNETIC GEOPHYSI-CAL INVESTIGATIONS OF PERMAPROST.

Arcone, S.A., et al, International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.501-507, With Russian and French summaries. 6 refs.

Sellmann, P.V., Delaney, A.J.

PERMAFROST PHYSICS, ELECTRICAL PROP-ERTIES, ELECTRICAL PROSPECTING, PERMA-FROST DISTRIBUTION, MEASURING INSTRU-

Radiowave surface impedance (SI) and LF (200-400 kHz) and VLF (10-30 kHz) and magnetic induction (MI) methods were used to investigate permafrost properties and distribution in the Pairbanks and Copper River Basin areas of Alaska. Recently developed portable field instruments were used. The sites contained a range of materials and ground ice of varying volume and type. Galvanic resistivity soundings and existing borehole data provided ground truth for data comparison. Local plane wave interpretations of the LF and VLF apparent resistivity and phase data correlated with subaurface conditions. Frequencies in the LF band were most sensitive to permafrost conditions at the sites studied while VLF frequencies were more affected by conductive materials underlying the permafrost. The MI technique surface impedance (SI) and LP (200-400 kHz)

also correlated with subsurface control, but the coil spacing used limited the instrument's depth of penetration, making it more sensitive to variations in the active layer than the

MP 1102 THAW PENETRATION AND PERMAFROST CONDITIONS ASSOCIATED WITH THE LI-VENGOOD TO PRUDHOE BAY ROAD, ALAS-

Berg, R.L., et al, International Conference on Perma frost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.615-621, With Russian and French summaries. 16 refs. Brown, J., Haugen, R.K.

32-3754

ROADS, PERMAFROST BENEATH ROADS, ACTIVE LAYER, HEAT TRANSFER, GROUND THAWING, CONTINUOUS PERMAFROST, DIS-CONTINUOUS PERMAPROST, THERMAL REGIME, UNITED STATES—ALASKA— STATES-ALASKA REGIME PRUDHOE BAY.

PRUDHOE BAY.

An environmental engineering study including the 88 kilo-neter TAPS Road and the 580 kilo-meter Alyeaks Pipeline Haul Road was initiated during the summer of 1976. Physiography along the route ranges from the rolling Yukon-Tanana Uplands, where the permafrost is warm (-1 C) and discontinuous, through the Brooks Range and the Arctic Foothills to the Arctic Coastal Plain, where permafrost is cold (-10 C) and continuous. Permanently frozen subgrade materials range from rock to extremely lec-rich fine-grained silts. Approximately 30 sites have been selected for measuring thay subsidence and seasonal thay enertration: instrumenta-Approximately 30 sites have been selected for measuring thaw subsidence and seasonal thay penetration; instrumentation for measuring air temperatures has been installed at 1 sites and surface temperatures were also measured at three of these sites. The 1976 thawing indexes varied from 350C degree-days at Prudhoe Bay to 1880C degree-days at Livengood. Measured thaw penetration in undisturbed areas adjacent to the road varied from 28 cm to 112 cm. The calculated gravel embankment thickness to prevent subgrade thawing during the 1976 thawing season ranged from 1.9 m near Prudhoe Bay to 5.2 m near Livengood.

MP 1103 DENSIFICATION BY FREEZING AND THAW-ING OF FINE MATERIAL DREDGED FROM WATERWAYS.

Chamberlain, E.J., et al, International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Re-search Council of Canada, 1978, p.622-628, With Russian and French summaries. 11 refs. Blouin, S.E.

32-3755 DREDGING, SOIL COMPACTION, FINES FREEZE THAW CYCLES.

FREZE THAW CYCLES.

Volume changes and permeabilities for fine material dredged from waterways were observed in the laboratory after full consolidation and freeze-thaw cycling for applied pressures in the range of 0.93 to 30.73 kN/sq m. Up tc 20% volume reduction was observed when dredged materials with liquid limits in the range of 60 to 90% were subjected to freeze-thaw cycling. Vertical permeabilities were observed to increase by as much as two orders of magnitude. The technical and economic feasibility of using freeze-thaw overconsolidation procedures to increase the volume of material stored in disposal sites is considered.

MP 1104

ENGINEERING PROPERTIES OF SUBSEA PERMAFROST IN THE PRUDHOE BAY RE-GION OF THE BEAUFORT SEA.

Chamberlain, E.J., et al, International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Re-search Council of Canada, 1978, p.629-635, With Rus-sian and French summaries. 14 refs.

ellmann, P.V., Blouin, S.E. 32-3756

SUBSEA PERMAFROST, DRILLING, DRILL CORE ANALYSIS, FROZEN ROCK TEMPERA-TURE, BEAUFORT SEA.

TURE, BEAUFORT SEA.

Core samples, cone penetration resistance and temperature data obtained from subsea sediments near Prudhoe Bay, Alaska, provided the basis for this study. The sites were located 1 to 17 km from shore in 2 to 12 m of water Maximum hole depth was 50 m. The materials at the drill sites included sands and gravels overlain by 4.5 to 7.5 m of silts and clays. No ice-bonded materials were observed, although thermal data indicated that permafrost was present. Index property, traixial compressive strength, consolidation and permeability data were obtained in the laboratory. Strengths ranged between 25 and 270 kPa for the fine material. Highly overconsolidated clays were encountered at the site farthest from shore. The preconsolidation pressure was estimated to be 1.5 MPa. Based on considerations of geologic and climatic history, it is proposed that the overconsolidation is a result of freezing and thawing

MP 1105 STRENGTH AND DEFORMATION OF FROZEN

Haynes, F.D., International Conference on Perma-frost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Re-search Council of Canada, 1978, p.655-661, With Rus-sian and French summaries. 20 refs. 32-3760

FROZEN FINES, TENSILE STRENGTH, COM-PRESSIVE STRENGTH, FROZEN GROUND TEMPERATURE DEFORMATION.

TEMPERATURE, DEFORMATION.
Results are given for tests made in uniaxial tension and uniaxial compression on frozen Fairbanks silt. These constant displacement rate tests were made over a strain rate range from .00016/s to 2.9/s and a temperature range from OC to -57C. Over these ranges athe compressive strength increased about one order of magnitude, while the tensile strength doubled over the strain rate range and increased about one order of magnitude over the temperature range. For increasing strain rate and decreasing temperature, the specific energy for the compression tests and the modulus increased; but the specific energy for the tension test decreased; but the specific energy for the tension tests and temperature. The increase in strength with higher strain rates and lower temperatures is explained by the strength of the ice matrix, changes in the unfrozen water content, and intergranular friction.

MP 1106

INFLUENCE OF FREEZING AND THAWING ON THE RESILIENT PROPERTIES OF A SILT SOIL BENEATH AN ASPHALT PAVEMENT.

Journson, J.C., et al, International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.662-668, With Russian and French summaries. 9 refs. Cole, D.M., Chamberlain, E.J. 32-3761 et al, International Conference on Pe

FROZEN FINES, FREEZE THAW CYCLES, ROADS, PAVEMENTS, STRESS STRAIN DIA-GRAMS, MODELS.

GRAMS, MODELS.

Stress-deformation data for silt subgrade soil were obtained from in-situ tests and laboratory tests, for use in mechanistic models for design of pavements affected by frost action. Plate-bearing tests were run on bituminous concrete pavements constructed directly on a silt subgrade, applying repeated loads to the pavement surface while the silt was frozen, thawing, thawed, and fully recovered. Repeated-load laboratory triaxial tests were performed on the silt in the same conditions. Analysis of deflection data from the in-situ tests showed resiliant moduli of the silt as low as 2000 kPa for the critical thawing period, and 100,000 kPa or higher when fully recovered. Analysis of the laboratory tests, which gave moduli comparable to the latter values, showed that resilient modulus during recovery from the thawweakened condition can be modeled as a function of the changing moisture content. changing moisture content.

MP 1107

SOME EXPERIENCES WITH TUNNEL ENTRANCES IN PERMAPROST.

Linell, K.A., et al, International Conference on Perm frost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.813-819, With Russian and French summaries. 9 refs.

Lobacz, E.F. 32-3783

TUNNELS, PERMAFROST CONTROL, COOL-ING SYSTEMS.

ING SYSTEMS.

Tunnels and shafts in permafrost encounter special portal problems because of instability of surface materials during thaw, tendency for ice formation within the tunnel from annual thaw zone seepage, and necessity for coutrol of six temperatures within the tunnel during summer. In constructing a tunnel in permafrost at Fox, Alsaka, these problems were successfully solved. The unstable ground slope at the tunnel entrance was stabilized by use of a blanket of clean natural gravel. Refrigerant pipes imbedded in the backfill above the portals were used with a mechanical refrigeration system to insure a frozen zone around the tunnel where seepage would otherwise enter in summer. An insulated bulkhead containing doors permitted exclusion of warm summer sir. Batrance to a vertical shaft connecting to the rear of the tunnel was kept shaded in order to minimize seepage entrance in summer.

MP 1108

CONSTRUCTION ON PERMAPROST AT LONG-

YEARBYEN ON SPITSBERGEN.
Tobiasson, W., International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.884-890, With Russian Change, 1978, p.884-890, With Russi sian and French summaries. 6 refs.

ROADS, FLOOD CONTROL, BUILDINGS, PER-MAFROST BENEATH ROADS, FOUNDATIONS, PAD FOUNDATIONS, PERMAFROST DEGRA-

Facilities at Longyearbyen were designed and are being operated with an appreciation for the importance of press ving permafrost. Portions of the network of gravel roads and paved runway were constructed on ice-rich permafrost. Ditpermafrost. Portions of the network of gravel roads and paved runway were constructed on ico-rich permafrost. Ditches, culverts and bridges have been sized to accommodate large peak flows since flash floods have occurred. Some difficulties have been experienced with progressive degradation of permafrost by surface and groundwater. Damming a low area and pumping out brackish water has created a year-round water supply lake. The post and pad foundation concept used extensively has proved quite successful. The hangar is an impressive use of an elevated floor above permafrost. Older buildings have been stabilized by adding alag insulation above supporting soils and installing open skirting below the first floor. Water lines and other utilities are supported on timber bents anchored in permafrost.

MP 1109 DETAILS BEHIND A TYPICAL ALASKAN PILE POUNDATION.

Tobiasson, W., et al, International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.891-897, With Russian and Prench summaries. 7 refs. Johnson, P. 32-3795

BUILDINGS, FOUNDATIONS, PERMAFROST BENEATH STRUCTURES.

BENEATH STRUCTURES.

When a warehouse at Barter laland burned down, a replacement was urgently needed. The new foundation consists of forty-five steel pipe piles, 25 m in diameter, set in 4.6 to 5.8 m deep holes made with a 4.6 m diameter auger. The annulus was backfilled with a sand-water sturry. Sturry freezeback was closely monitored using thermocouples. As freezeback was rapid, the contractor was allowed to set steel beams on a pile five days after it was installed and pour concrete ten days after the last pile was set. Groundwater problems during July required casing of augered holes with 5.1 m diameter pipe to a depth of 1 m. Mechanical difficulties and lack of a crane slowed pile installation, but contractor resourcefulness got the job done. Subsequent elevation surveys and thermocouple measurements indicate that the foundation is solidly frozen and stable.

LAND APPLICATION OF WASTEWATER IN PERMAPROST AREAS.

Sletten, R.S., International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.911-917, With Russian and French summaries. 14 refs.

WASTE WASTES TREATMENT, WATER TREATMENT, IRRIGATION.

TREATMENT, IRRIGATION.

Land application of wastewater can serve as a high performance treatment system, as a final disposal step for treated effluents, and as a pollabing step for partially treated effluents. Experimental stadies conducted near Fairbanks, Alaska, during 1974-76 investigated both high (5.5 to 152 meters/year) and low rate (0.6 to 5.5 m/yr) systems for the purpose of polishing sersted lagoon effluent to meet secondary treatment criteria. Results from the slow rate system indicate that drinking water quality can be achieved. However, even though nitrogen removal is not as great, the high rate (rapid infiltration) system is considered to be more feesible for cold climate conditions because the need for winter storage is less, the system does not rely on vegetainve uptake, and the free-draining, coarse-textured soils necessary for such systems can be found in alluvial valleys and coastal areas where many Arctic communities are located. For most westewater constituents, high rate systems are capable of sustained, effective performance in extreme climates.

RADAR ANISOTROPY OF SEA ICE DUE TO PREFERRED AZIMUTHAL ORIENTATION OF

Kovacs, A., et al, Arctic Ice Dynamics Joint Experiment. AIDJEX bulletin, Mar. 1978, No.38, p.171-201, 32 reft.
Morey, R.M. 32-3878
ICR CRESSION.

ICE CRYSTAL STRUCTURE, SEA ICE, OCEAN CURRENTS, RADAR ECHOES, ANISOTROPY.
Results of impulse radar, ice crystal c-axis and sub-ice current
measurements on the fast-ice near Narwhal Island, Alaska,
are presented. The crystal structure of the ice was found
to have a horizontal crystal c-axis with a preferred azimuthal
orientation. This orientation was found to align with the
direction of the current at the ice water interface. Impulse
radar reflection measurements revealed that the preferred
orientation of the sea ice crystal structure behaved as a
microvave polarizer. It was observed that when the antenna
B-field was oriented parallel with the c-axis of the crystal
platelets a strong reflection of the radar signal from the
bottom of the ice was obtained. However, when the
antenna B-field was oriented perpendicular to the c-axis,
no bottom reflection was detected. The results of this
study fully support earlier reports of sea ice in-homogeneity
and anisotropy in reference to both structure and electromagnetic energy transmission. CURRENTS, RADAR ECHOÉS, ANISOTROPY.

LAND TREATMENT MODULE OF THE CAP-DET PROGRAM.

Merry, C.J., et al, Symposium on Military Applica-tions of Environmental Research and Engineering. tions of Environmental Research and Engineering, 8th, Dec. 7-8, 1977. Edgewood, Maryland, 1977, 4p. Spaine, P.A. 32-3941 WASTE TREATMENT, WATER TREATMENT, COMPUTER PROGRAMS.

PRELIMINARY ANALYSIS OF WATER EQUIVALENT/SNOW CHARACTERISTICS USING LANDSAT DIGITAL PROCESSING TECHNIQUES.

Merry, C.J., et al, Eastern Snow Conference, Feb. 3-4, 1977, Belleville, Ontario, Canada. Proceedings, 1977, 16 leaves, 20 refs.

icKim, H.L., Cooper, S., Ungar, S.G.

32-3942 REMOTE SENSING, DATA PROCESSING, SNOW WATER EQUIVALENT, SNOW DEPTH. SNOW WATER EQUIVALENT, SNOW DEPTH.

The prinary emphases of this analysis were to evaluate the accuracy of mapping the areal extent of snow and to determine the relationship between the water equivalent of the snowpack and the radiance obtained from the LANDSAT digital data. The test area selected for this task was the Dickey-Lincoln School Lakes Project located above the confluence of the St. John and Allagash Rivers in northern Maine. The computer algorithm utilized in this study uses two features—"color" and "alledo"— of the LANDSAT digital data to classify the multispectral data into land and water categories. Three snow courses (Allagash R. Beech Ridge and Ninemille By jekting snow depth and water equivalent data were located. This task was accomplished using computer-generated gray scale printouts (scale 1:24,000) and topographic maps. The preliminary results indicated that the snow radiance values remained approximately the same for a similar water equivalent value of 9.5 inches. Extrapolation of these radiance values for the entire watershed can be used to map the areal extent of snow cover/vegetation with a water equivalent value of 9.5 inches which enables computation of potential water runoff.

USE OF THE LANDSAT DATA COLLECTION SYSTEM AND IMAGERY IN RESERVOIR MANAGEMENT AND OPERATION. Cooper, S., et al, Waltham, Massachusetts, U.S. Army Corps of Engineers, 1977, c150p., Numerous refs. Buckelew, T.D., McKim, H.L., Merry, C.J. 32-3943 WATERSHEDS, REMOTE SENSING, SPACE-

MP 1114

WATERSHEDS, REMOTE SENSING, SPACE-BORNE PHOTOGRAPHY, COMPUTER AP-PLICATIONS, SNOW WATER EQUIVALENT. The New Ragland Division Corps of Engineers demonstrated the use of the data collection and imagery systems in watershed management. A surplus antenna podestal was refurbished and interfaced with a computer to provide an automatic ground receiver station with operated nearly continuously for over 18 months. Adequate reliability for operations use was proven, and daily procedures were compressed to no half hour of operator time per day. Comparison of costs and operation constraints were drawn among Landsat DCS, GOES DCS, and ground-based radio. Computer compatible tapes of Landsat imagery were analyzed to evaluate the mapping accuracy of the area of snow to determine a relationship between the water equivalent of a anowpack and the radiance recorded in Landsat digital data, and to delineate wetlands and flood areas in New England. Sensor interfaces were developed and evaluated for the collection interfaces were developed and evaluated for the collection of real time environmental data via the Landsat DCS

MP 1115 ECOLOGICAL BASELINE INVESTIGATIONS ALONG THE YUKON RIVER-PRUDHOE BAY HAUL ROAD, ALASKA.

Brown, J., ed. Hanover, New Hampshire, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, 131p., Progress report to the Department of En-ergy. For individual reports see 32-3889 through 32-3896.

32-3888 ROADS, ENVIRONMENTS, VEGETATION, PLANTS (BOTANY), MAPPING.

DISTRIBUTION AND PROPERTIES OF ROAD DUST AND ITS POTENTIAL IMPACT ON TUN-DEA ALONG THE NORTHERN PORTION OF THE YUKON RIVER-PRUDHOE BAY HAUL ROAD. CHEMICAL COMPOSITION OF DUST AND VEGETATION.

AND VEGETATION.

lakandar, I.K., et al, Ecological baseline investigations along the Yukon River-Prudhoe Bay Haul Road, Alaska, edited by J. Brown. MP 1115, Hanover, New Hampshire, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.110-111, 2 refs. Quarry, S.T., Brown, J. 32-3896

ROADS, DUST, TUNDRA VEGETATION, CHEMICAL ANALYSIS, ION DENSITY (CONCENTRATION).

OBTAINING FRESH WATER FROM ICE-

Mellor, M., Akademiia nauk SSSR. Institut geografii. Materialy giiatsiologicheskikh issledovanti. Khroni-ka obsuzhdeniia, 1977, Vol.31, p.193, ln Russian. 32-3932

SUPPLY, ICEBERGS, ECONOMIC ANALYSIS.

Conclusions of two conferences on the towing and utilization of icebergs, one held in Paris in June, 1977, the other at the University of Iowa in Oct., 1977, are reviewed. There is keen interest in water supply from icebergs, but technical problems remain. Rough estimates indicate that obtaining water from icebergs may be economically useful for rich countries with a freah-water shortage.

MP 1118

MP 1118

SOME CHARACTERISTICS OF GROUNDED

FLOEBERGS NEAR PRUDHOE BAY, ALASKA.

Kovaca, A., et al, Arctic, Sep. 1976, 29(3), p.169-172,

10 refs. For another version of this paper see 32-1083.

32-1082

SEA ICE, SOUNDING, ICE BOTTOM SURFACE, ACOUSTIC MEASURING INSTRUMENTS, ICE STRUCTURE, PRESSURE RIDGES.

ARCTIC AND SUBARCTIC ENVIRONMENTAL ANALYSIS.

ANALYSIS.
Anderson, D.M., et al, Army research and development, Dec. 1972, 13(8), p.28-30.
Haugen, R.K., Gatto, L.W., Slaughter, C.W., McKim, H.L., Marlar, T.L.

27-2043 REMOTE SENSING, TERRAIN IDENTIFICA-TION, ERTS IMAGERY.

The authors indicate that data from the Earth Resources Technology Satellite, ERTS-1, will provide greater opportunity to study relationships between anow pack and river ice, surface circulation and coastal sedimentation processes, and permafrost-vegetative relationships. An example of ERTS-1 imagery of a 115 square mile area 250 miles NW of Fairbanks, Alaska is shown with detailed identification of cloud and terrain features.

MP 1120

MESOSCALE DEFORMATION OF SEA ICE FROM SATELLITE IMAGERY.

Anderson, D.M., et al. U.S. National Aeronautics and Space Administration. Contractor report, Oct. 25, 1973, NASA-CR-135741, 2p., N73-33307. Crowder, W.K., McKim, H.L., Hibler, W.D., III. 29-141

SEA ICE, ICE MECHANICS, REMOTE SENSING. ERTS IMAGERY.

MP 1121

ICE AND SNOW AT HIGH ALTITUDES.

Mellor, M., Symposium on High Altitude Geoecology, Denver, Colorado, Feb. 20-25, 1977. American As-sociation for the Advancement of Science, 1977, 10p. 32-4179

SNOW PHYSICS, SNOW MECHANICS, ICE PHY-SICS.

MP 1122

OPPORTUNITIES FOR PERMAPROST-RELAT-ED RESEARCH ASSOCIATED WITH THE TRANS-ALASKA PIPELINE SYSTEM.

National Research Council. Polar Research Board. Committee on Permafrost, Washington, D.C., National Academy of Sciences, 1975, 37p., Report of Workshop, March 19-22, 1975, Scottsdale, Arizona.
32-4221

MEETINGS, RESEARCH PROJECTS, PERMA-FROST, PIPELINES.

MP 1123

EFFECTS OF HOVERCRAFT, WHEELED AND TRACKED VEHICLE TRAFFIC ON TUNDRA. Abele, G., National Research Council. Canada. Associate Committee on Geotechnical Research. Technical memorandum, Mar. 1976, No.116, Musikeg Research Conference, 16th, Oct. 7, 1976. Proceedings,

186-215, 16 refs. p.180-... 31-1510

AIR CUSHION VEHICLES, TRACKED VEHI-CLES, VEHICLE WHEELS, TUNDRA VEGETA-TION, DAMAGE.

TION, DAMAGE.

In support of the Advanced Research Projects Agency (ARPA) Arctic Surface Bifects Vehicle (ASEV) Program, traffic tests were conducted during the summer of 1971 near Barrow, Alaska, on various types of tundra terrains using an SK-5 Air Cushion Vehicle. The main objectives of the study were to investigate the effects of air cushion vehicle operations and traffic on tundra, specifically, the extent and pattern of erosion, the degree of damage, initial and permanent, to the vegetation, the subsequent effect on the soil thermal regime due to any surface disturbance by the ACV, and to compare the general ecological impact of ACV traffic with that of other ground vehicles.

MP 1124 DIFFICULTIES OF MEASURING THE WATER SATURATION AND POROSITY OF SNOW. Colbeck, S.C., Journal of glaciology, 1978, 20(82),

p.189-201, 26 refs. 32-4457

WET SNOW, SNCW WATER CONTENT, POROSITY, SATURATION, MEASURING IN-STRUMENTS, ACCURACY, REMOTE SENSING. STRUMENTS, ACCURACY, REMOTE SENSING. Liquid saturation and porosity control most of the important material properties of wet snow, hence accurate measurements of these two parameters are of the utmost importance for both field research and glaciological applications. Nevertheless, most of the instruments in use are not capable of making accurate determinations of saturation. An error analysis shows that only direct measurements of the liquid volume can provide accurate values of water saturation, hence the melting calorimeter is inherently inaccurate. While centrifuges extract tome of the liquid for direct measurement, there is always some residual liquid left, depending on the grain size and structural parameters of the ice matrix. Therefore, some uncertainty exists over the interpretation of the data obtained from centrifuses. grain size and structural parameters of the ice matrix. Interfere, some uncertainty exists over the interpretation of the data obtained from centrifuges. High-frequency capacitance probes can be used either in situ or on the surface and are very sensitive to the volume of flquid present. Capacitance probes are by far the best of the available devices.

MP 1125 MP 1125
1977 TUNDRA FIRE IN THE KOKOLIK RIVER
AREA OF ALASKA.
Hall, D.K., et al, Arctic, Mar. 1978, 31(1), p.54-58,
ADA-062 439, 10 refs.

Brown, J., Johnson, L.A 32-4577 TUNDRA VEGETATION, REMOTE SENSING, SPACEBORNE PHOTOGRAPHY. THAW SPACERORNE DEPTH, FIRES.

DRF11, FIRES.

The authors describe a lightning-set fire on the north coset of Alaska southwest of Barrow in July-August, 1977. Ground and satellite observations were made to determine the effects of the fire on the numbra vegetation and the thaw depth of the permafrost. The study indicates that natural drainages form effective fire breaks in the region and that fire intensity is related to vegetation type and the moisture present in the soil.

MP 1126 RADAR PROFILE OF A MULTI-YEAR PRES-SURE RIDGE FRAGMENT.

Kovacs, A., Arctic, Mar. 1978, 31(1), p.59-62, 9 refs. 32-4578 SEA ICE, PRESSURE RIDGES, RADAR ECHOES,

ICE COVER THICKNESS.

The usefulness of radar profiling pressure ridges of multi-year ice is described. Radar echoes provide thickness messurements of ridge keels and sails and help to define the most difficult of all Arctic obstacles. The author warns, however, that the radar technique is still in its infancy and all but excludes profiling the thickness of first-year ice pressure ridges.

MP 1127

EFFECT OF TEMPERATURE AND STRAIN RATE ON THE STRENGTH OF POLYCRYSTAL-LINE ICE

Haynes, F.D., National Research Council, Canada. Associate Committee on Geotechnical Research. Technical memorandum, Oct. 1977, No.121, p.107-111, 8 refs.

32-4701 ICE CRYSTALS, ICE STRENGTH, TEMPERA-TURE EFFECTS, STRAIN TESTS, SNOW ICE.

The focus of this paper is on the results of laboratory tests on polycrystalline, isotropic snow ice. Test temperatures ranged from OC to -56C, and strain rates ranged from OC to 0.1/sec. Tests in both uniaxial compression and uniaxial tension were made on dumbbell-shaped specimens.

MP 1128 ICEBERG THICKNESS AND CRACK DETEC-

Kovaca, A., International Conference and Workshops on Iceberg Utilization for Fresh Water Production, Weather Modification, and Other Applicationa, 1st, Iowa State University, Ames, October 2-6, 1977. Proceedings. Edited by A.A. Husseiny, New York, Pergamon Press, 1978, p.131-145, 18 refs. 32-4718

ICEBERGS, ICE COVER THICKNESS, RADAR BCHOES, ICE ISLANDS, CREVASSES, ICE CRACKS, ANTARCTICA—MCMURDO SOUND. CRACKS, ANTARCTICA—MCMURDO SOUND.
Results obtained with an impulse radar system used to profile the thickness of and detect cracks in a tabular icohergin McMurdo Sound, Antarctics, and an ice island in the Beautort See near Plaxman Island, Alsaka, are presented. Graphic records are shown of the radar impulse travel time which clearly reveal, for the first time, the bottom relief of each ice formation. Also detected in the antarctic icoherg was an echo signature from an infiltration-brine layer. The impulse radar signature of a 3-m wide crevasse in the McMurdo Ice Sheff is also shown. The time of flight of the radar impulse in the ice island is compared with a 24.03-m drill hole measurement of the ice thickness. The effective velocity of the radar impulse in the ice island was found to be 0.16m/ns and the effective delectric constant of the ice to be 3.5. The friedings show that tabular icebergs are flawed by cracks or crevasses which could be expected to propagate through the ice when an iceberg reaches the edge of the pack where it is subject to stresses induced by sea swell and waves. (Auth.)

MP 1129

MP 1129
CATALOG OF SNOW RESEARCH PROJECTS.
Hanover, N.H., U.S. Army Cold Regions Research
and Engineering Laboratory, Oct. 1975, 103p.
Dumont, N., ed.

SNOW SURVEYS, RESEARCH PROJECTS.

MP 1130 SHALLOW SNOW PERFORMANCE OF WHEELED VEHICLES.

Harrison, W.L., International Conference of the International Society for Terrain-Vehicle Systems, 5th, Detroit, Mich., June 2-6, 1975, Proceedings. Vol.2, Hoboken, N.J., 1976₁, p.589-614, 14 refs.

13-440
SNOW COMPRESSION, TRACTION, LOADS
(FORCES), SNOW MECHANICS, RUBBER
SNOW FRICTION, SNOW COMPACTION,
ANALYSIS (MATHEMATICS), VEHICLES.

MP 1131 MATHEMATICAL MODEL TO PREDICT FROST HEAVE.

Berg, R.L., et al, International Symposium on Frost Action in Soils, Lukes, Sweden, Feb. 1977. Proceedings, Vol.2, University of Lules, 1977, p.92-109, 14 refs.

er, K.E., Guymon, G.L.

32-345

MATHEMATICAL MODELS, SOIL WATER MI-GRATION, HEAT TRANSFER, FROST HEAVE, FROST PENETRATION.

PROST PENETRATION.

A mathematical model of coupled heat and moisture flow in soils has been developed. The model includes algorithms for phase change of soil moisture and frost heave, and several types of boundary and initial conditions are permitted. The finite element method of weighted residuals (Galerkin procedure) was chosen to simulate the spatial regime and the Crank-Nicolson method was used for the time domain portion of the model. Comparison of simulated and experimental data illustrates the importance of unsaturated hydraulic conductivity. It is one parameter which is difficult to measure and for which only a few laboratory test results are available. Therefore, unsaturated hydraulic conductivities calculated in the computer model may be a significant source of error in calculations of frost beave.

MIP 1132

MP 1132 SEA ICE PRESSURE RIDGES IN THE BEAU-FORT SEA.

Wright, B.D., et al, IAHR Symposium on Ice Prob-lems, Lulei, Sweden, Aug. 7-9, 1978. Proceedings, Part 1, International Association for Hydraulic Research, 1978, p.249-271, 10 refs. Hnatiuk, J., Kovacs, A.

SEA ICE, PRESSURE RIDGES, ICE MODELS.

SEA ICE, PRESSURE RIDGES, ICE MODELS.

The ice cover in the Beaufort Sea is characterized by extreme irregularities in thickness which are produced by the motion and resulting deformation of the sea ice. Pressure ridges, which are an integral part of this irregular and formidable ice cover, sea recognized as the largest and most hazardous ice formations. Here, a number of cross-sectional profiles of first and multi-year pressure ridges in the Beaufort Sea are presented, which include both free-floating and grounded ice forms.

The cross-sections of these multi-year ridges model with a constant sail to keel ratio and geometry. It is shown that the ice comprising multi-year ridges is

solid, with the interblock voids existing at the time of their formation being completely filled with ice. Several first-year pressure ridge profiles are also discussed, which indicate that these ridges cannot be represented by any one geometric model as their sail to keel ratios and geometries are quite variable.

MP 1133

ICE AND NAVIGATION RELATED SEDIMEN-

TATION.
Wuebben, J.L., et al, IAHR Symposium on Ice Problems, Luleå, Sweden, Aug. 7-9, 1978. Proceedings, Part 1, International Association for Hydraulic Research, 1978, p.393-403, 5 refs.

Alger, G.R., Hodek, R.J.

ICE COVER EFFECT, ICE NAVIGATION, SEDI-MENT TRANSPORT.

MENT TRANSPORT.

This paper examines the hydrodynamics of vessel passage through a restricted channel and the resulting potential for sediment translocation.

Examples of field measurements are presented which show a complex pattern of changes in water current magnitude and direction. The constriction of the channel by a ship creates a drop in the water surface that travels with the ship. The application of the concepts of effective stress and upward seepage forces to the riverbed material predicts that the potential for sediment translocation increases upon the passage of this moving trough. Three modes of granular bottom sediment transport were observed bed load, saltation, and a process referred to as explosive liquefaction. liquefaction.

MP 1134

ARCHING OF MODEL ICE FLOES AT BRIDGE

PIEMS.
Calkins, D.J., IAHR Symposium on Ice Problems, Lules, Sweden, Aug. 7-9, 1978. Proceedings, Part 1, International Association for Hydraulic Research, 1978, p.495-507, 7 refs.

RIVER ICE, ICE FLOES, BRIDGES, PIERS, ICE PRESSURE, ICE MODELS, ICE DEFORMATION. PRESSURE, ICE MODELS, ICE DEFORMATION.

A model study of the formation of ice arching at the upstream faces of rounded bridge piers was conducted in a hydraulic flume. Polyethylene plastic was used to simulate square ice floes of two sizes, 37 mm and 74 mm. A power function relating the upstream surface ice concentration to a size ratio (characteristic block size over pier span opening) distinguishes between the arching and non-arching conditions at velocities below the critical value for underturning of individual ice floes individual ice floe

MP 1135

FRAZIL ICE FORMATION IN TURBULENT

Muller, A., et al, IAHR Symposium on Ice Problems, Luleå, Sweden, Aug. 7-9, 1978. Proceedings, Part 2, International Association for Hydraulic Research, 1978, p.219-234, 9 refs.

Calkins, D.J. 33-400

FRAZIL ICE, ICE FORMATION, TURBULENT FLOW, SUPERCOOLED WATER, ICE NUCLEI.

FLOW SUPERCOOLED WATER, ICE NUCLEI.

To study ice nucleation and heat transfer, frazil ice was produced experimentally under controlled conditions. Turbulence was generated by a moving grid in a turbulence jar, where water could be cooled below the freezing point. Frazil was observed by means of a schileren system and the number of ice particles was counted on photographs. No frazil ice formed, regardless of turbulence and foreign material, unless the water was seeded with ice nuclei. The number of particles grew during the experiment; the growth rate increased with greater supercooling and higher velocity of the grid. This indicates a multiplication process induced by secondary nucleation. The heat transfer per particle owns constant in all experiments within the accuracy of measurement. From these observations, it can be concluded that the total ice production is predictable if the heat transfer per particle can be estimated from turbulence data and if the number of particles can be calculated. A nucleation theory is, however, not available and is regarded as the crucial question.

MP 1136

MP 1136
RIGHTING MOMENT IN A RECTANGULAR
ICE BOOM TIMBER OR PONTOON.
Perham, R.E., IAHR Symposium on Ice Problems,
Luleá, Sweden, Aug. 7-9, 1978. Proceedings, Part 2,
International Association for Hydraulic Research,
1978, p.273-289, 5 refs.
33-413

ICE BOOMS, FLOATING STRUCTURES.

ICE BOOMS, FLOATING STRUCTURES.

The ability of an ice boom timber to restrain ice floes is governed by its capacity to float and to resist being overturned. Six mathematical equations that describe this capacity for a rectangular-shaped timber have been worked out and are presented here. The limits of each equation are also given. They are called righting moment equations, and from them dimensionless values of righting moment may be calculated. The equations have been evaluated for some general conditions, and for a few specific cases involving water and wood, and for one case concerned with designing a steel pontoon boom. The calculations were done by a computer program which is not included. The

data provided include three graphs and two tables of dimension-less values. All in all, the information should be very useful in evaluating new designs of ice boom timbers and

MP 1137

ENTRAINMENT OF ICE FLOES INTO A SUB-

MERGED OUTLET.
Stewart, D.M., et al, IAHR Symposium on Ice Problems, Luled, Sweden, Aug. 7-9, 1978. Proceedings, Part 2, International Association for Hydraulic Research, 1978, p.291-299, 2 refs.

Ashton, G.D. 33-414

FLOATING ICE, WATER INTAKES, WATER FLOW

FLOW.

Results of a series of laboratory experiments in a flume to determine the conditions under which floating ice floes are entrained into a submerged outlet are reported. In the sum of the sum o

MP 1138

ICE ARCHING AND THE DRIFT OF PACK ICE THROUGH CHANNELS.

AMECUGHI CHANNELS, Sodhi, D.S., et al, IAHR Symposium on Ice Problems, Lulea, Sweden, Aug. 7-9, 1978. Proceedings, Part 2, International Association for Hydraulic Research, 1978, p.415-432, 25 refs. Weeks, W.F.

Weeks, W.F.

33-423

SEA ICE, DRIFT, WIND VELOCITY, CHANNELS
(WATERWAYS), ICE MODELS.

Models originally developed to describe the arching and
the movement of granular materials through hoppers or chutes
are spelled to arching and drift of pack ice in straits and
aults having lengths of 50 to 500 km. Verification of
the usefulness of the models is attempted by making comparisons with ice deformation patterns as observed via satellite
imagery in the Bering Strait region and in Amundsen Gulf.
The results are encouraging in that there is good correspondence between observed arching and lead patterns and those
predicted by theory. In addition, values determined via
the model for the angle of internal friction and the cohesive
strength per unit thickness are similar to values obtained
by other approaches. It is estimated that if the wind
velocity parallel to the Bering Strait exceeds 6 m/s, there
will be ice flow through the strait. A one-dimensional
formulation is presented, governing the ice pressure in a
straight channel when the ice is stationary due to an ice
arch or a boom.

MP 1130

RADAR ANISOTROPY OF SEA ICE DUE TO PREFERRED AZIMUTHAL ORIENTATION OF HORIZONTAL C AXES OF ICE CRYSTALS.

Kovacs, A., et al. Journal of geophysical research, Dec. 20, 1978, 83(C12), p.6037-6046, 36 refs. Morey, R.M. 33-2286

SEA ICE, RADAR ECHOES, ANISOTROPY, ICE CRYSTAL STRUCTURE, ELECTROMAGNETIC PROPERTIES, OCEAN CURRENTS.

PROPERTIES, OCEAN CURRENTS.

Results of impulse radar, ice crystal c axis, and subice current measurements on the fast ice near Narwhal Island, Alaska, are presented. The crystal structure of the ice was found to have a horizontal crystal c axis with a preferred azimuthal orientation. This orientation was found to align with the direction of the current at the ice-water interface. Impulse radar reflection measurements revealed that the preferred orientation of the sea ice crystal structure behaved as a microwave polarizer. It was observed that when the antenna B field was oriented parallel with the c axis of the crystal platelets, a strong reflection of the radar signal from the bottom of the ice was obtained. However, when the antenna B field was oriented perpendicular to the c axis, no bottom reflection was detected. The results of this study fully support earlier reports of sea ice inhomogeneity and anisotropy in reference to both structure and electromagnetic energy transmission.

MP 1140

REPORT OF PANEL ON TESTING IN ICE.

Frankenstein, G.E., et al, International Tank Towing Conference, 15th, The Hague, September 1978. Pro-ceedings—Part 1, M.W.C. Oosterveld, editor, Wage-ningen, Netherlanda Ship Model Basin, 1978, p.157-179, 34 refs. 33-543

MEETINGS, ICE NAVIGATION, ICE CONDI-TIONS, ICE MECHANICS, IMPACT TESTS, ME-CHANICAL TESTS, PLASTICITY TESTS.

MP 1141 ICE RELEASING BLOCK-COPOLYMER COAT-INGS.

Jellinek, H.H.G., et al, Colloid and polymer sciences, 1978, Vol.256, p.544-551, In English with German summary. 7 refs.

summary. 7 refs. Kachi, H., Kittaka, S., Lee, M., Yokota, R.

PROTECTIVE COATINGS, POLYMERS, ICE RE-MOVAL, CHEMICAL ICE PREVENTION.

MP 1142

UPDATE ON SNOW LOAD RESEARCH AT CRREI.

Tobiasson, W., et al, Eastern Snow Conference. Proceedings, 1977, 34th, p.9-13, 20 refs.
Redfield, R.

33-624 SNOW LOADS, RESEARCH PROJECTS, SNOW DENSITY.

MP 1143

METHODOLOGY USED IN GENERATION OF SNOW LOAD CASE HISTORIES.

McLaughlin, D., et al, Eastern Snow Conference. Proceedings, 1977, 34th, p.163-174. Duggan, G. 33-631.

SNOW LOADS, ROOFS, DATA PROCESSING.

EFFECT OF WASTE WATER REUSE IN COLD REGIONS ON LAND TREATMENT SYSTEMS. lakandar, I.K., Journal of environmental quality, July-Sep. 1978, 7(3), p.361-368, 26 refs.

WATER TREATMENT, WASTE DISPOSAL, COLD WEATHER TESTS, SOIL CHEMISTRY.

COLD WEATHER TESTS, SOIL CHEMISTRY.

The effect on ground water quality and soils and vegetation of treatment and disposal of municipal/industrial waste water on land in cold regions was investigated using air outdoor test cells. Winter application of waste water was feasible even at very cold air temperatures (<0.0°C) at the New Hampshire test site. High NO3-N concentrations were observed in all treatments (5-15cm/week) in both soils in early summer. This was explained as leaching of NH4-H stored over the winter months after its oxidation to NO3 in early spring. The principal mechanism for nitrogen removal was found to be plant uptake, which was seasonally dependent. Application of 15 cm of secondary effluent per week to a sandy loam soil was not feasible because of the presence of >10mg/liter NO3-N in the leachate for >9 mo/year. Application of salts for road decicing during winter resulted in relatively higher concentrations of salts and Cl in the ground for a short period of time.

MP 1145

MP 1145

STATE OF KNOWLEDGE ON LAND TREAT-MENT OF WASTEWATER.

International Symposium on the State of Knowledge in International symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampshire, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, 2 vols., For selected papers see 33-651 through 33-661. 33-650

MEETINGS, WASTE TREATMENT, WATER TREATMENT, AGRICULTURE, FOREST LAND, MATHEMATICAL MODELS, LAND DEVELOP-

MENT.

MEN'I.

The objectives of this Symposium are to summarize the state of knowledge of the practical aspects of the treatment of wastewater by land application and to identify the suitable approaches for the design of such land treatment systems. The topics included are: site selection considerations, case studies of national and international concern, health effects of land treatment systems, pretreatment considerations, uses of wastewaters in agricultural and forest systems, monitoring, modeling and design criteria. The Proceedings are published or wastewaters in agricultural and forest systems, monitoring, modeling and design criteria. The Proceedings are published in two volumes. Volume 1 contains the invited papers presented and discussed at the conference. Volume 2 contains shorter papers about on-going research that were selected from the responses received following a call for abstracts.

USE OF REMOTE SENSING TECHNIQUES AND OTHER INFORMATION SOURCES IN REGIONAL SITE SELECTION OF POTENTIAL

LAND TREATMENT AREAS.

Merry, C.J., International Symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampshire. Proceedings, Vol.1, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.107-119, 27 refs.

33-651 SITE SURVEYS, WATER TREATMENT, WASTE TREATMENT, REMOTE SENSING, SPACE-BORNE PHOTOGRAPHY.

Landsat, Skylab S190A Multispectral Photographic Camera, and Skylab S190B Earth Terrain Camera satellite data products.

enlarged to scales of 1:500,000 and 1:250,000, were used to prepare land use maps for regional site selection of potential land treatment area. Interpretation of tonal and textural characteristics on the photography corresponded to vegetation, urban and agricultural land use categories. Color and color infrared transparencies sugmented the land use mapping, which was accomplished on black and white photographic prints. The three systems are compared in terms of areal coverage, resolution, and time of product preparation.

MP 1147

EVALUATION OF THE MOVING BOUNDARY THEORY IN CARCY'S FLOW THROUGH POR-

Nakano, Y. International Symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampahire. Proceed-ings, Vol.1, Hanover, U.S. Army Cold Regions Re-search and Engineering Laboratory, 1978, p.142-151, 22 refs

BOUNDARY VALUE PROBLEMS, SOIL WATER MIGRATION, POROUS MATERIALS, ANALYSIS (MATHEMATICS), THEORIES.

YSIS (MATHEMATICS), THEORIES.

Traditionally in hydrology and soil physics, neither the water table nor the wetting front in Darcy's flow were believed to be singular surfaces. Recently, a new and conflicting theory has been advanced, using two different approaches. It has been shown, based upon continuum physics, that across both the water table and the wetting front local acceleration generally suffers a non-zero jump, and these two boundaries can be interpreted as acceleration waves. This interpretation was found consistent with reported regularity results obtained from a purely mathematical viewpoint.

EVALUATION OF N MODELS FOR PREDICTION OF NO3-N IN PERCOLATE WATER IN LAND TREATMENT.

Iskandar, I.K., et al, International Symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampshire. Proceedings, Vol.1, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.163-169, 51 refs Selim. H.M.

WATER TREATMENT, SOIL CHEMISTRY, SEEPAGE, MATHEMATICAL MODELS.

SEEPAGE, MATHEMATICAL MODELS.

Nitrogen simulation models developed to describe one or more processes in agricultural soils can be adopted for land treatment. The most important processes in the simulation of N transformations for prediction of N in percolate water in land treatment are: intrification, dentirification, plant upstake and exchange of NH4 with the soil. The N model must be incorporated into a moisture flow model. It was concluded that the Michaelis-Menten type model is the most appropriate, although the first order kinetic may be used to describe nitrification process. Modeling the denirification process in slow infiltration must include biodegradable carbon and dissolved oxygen as limiting factors. Although several large models are available to simulate and predict N in leachate in land treatment, a need for a simplified model that can be tested in the field is apparent.

MP 1149 MP 1147 NITROGEN BEHAVIOR IN LAND TREAT-MENT OF WASTEWATER: A SIMPLIFIED MENT OF MODEL.

Selim, H.M., et al, International Symposium on the Settin, ri.M., et al, international symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampahire. Proceedings, Vol.1, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.171-79, 15 refs.

Iskandar, I.K. 33-654

WASTE TREATMENT, WATER TREATMENT, SOIL CHEMISTRY, SEEPAGE, MATHEMATICAL MODELS.

CAL MODELS.

A simplified mathematical model was developed to describe transformations and transport of nitrogen under transient soil water flow conditions. Kinetic reactions were assumed to govern the nitrification and denirrification processes. A macroscopic approach was used to incorporate plant uptake of water as well as NO3-N and NH4-N from the soil acolution. The sensitivity of the model to changes in rate of N transformation, N crotake by plants, and schedule and amounts of N application were also investigated. The model can be used as a tool to predict the fais of nitrogen in land treatment systems. The model is flexible and can be adapted to incorporate various nitrogen transformation mechanisms as well as layerings in the soil profile.

MP 1150 OVERVIEW OF EXISTING LAND TREATMENT SYSTEMS

Iskandar, I.K., International Symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampshire. Proceedings, Vol.1, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.193-200, 34 refs.

WASTE TREATMENT, WATER TREATMENT, SOIL CHEMISTRY, HISTORY.

This paper reviews existing systems of land application of wastewater. Particular emphasis is placed upon the historical philosophy of the utilization of the natural soil-plant system for purifying wastewater, reasons for the success or failure of the older systems, and experience gained from their design, construction and operation.

UPTAKE OF NUTRIENTS BY PLANTS IRRI-GATED WITH MUNICIPAL WASTEWATER EF-

Clapp, C.E., et al, International Symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampshire. Proceedings, Vol.1, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.395-404, 21 refs

Palazzo, A.J., Larson, W.E., Marten, G.C., Linden, D.R. 33-656

NUTRIENT CYCLE, IRRIGATION, WASTES, WATER TREATMENT, SOIL CHEMISTRY.

WATER TREATMENT, SOIL CHEMISTRY.

We present comparisons of plant nutrient uptake by corn and forage grasses when these crops were irrigated with secondary municipal wastewater effluent or treated with inorpanic fertilizer. Characteristic analyses of effluent from various locations are given for the macro plant nutrients as well as for quality indicators. The importance of the presence of varying amounts of N, P, and K in effluent studies is discussed. Micro elements in effluent are considered for their use to meet nutrient requirements of these crops as well as for their potential for environmental contamination.

MP 1152

PERFORMANCE OF OVERLAND FLOW LAND TREATMENT IN COLD CLIMATES.

Jenkins, T.F., et al, International Symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampahire. Pro-ceedings, Vol.2, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.61-70, 15 refs.

Martel, C.J., Gaskin, D.A., Fisk, D.J., McKim, H.L. 33-657

SOIL CHEMISTRY, COLD WEATHER PER-FORMANCE.

FORMANCE.
The objective of this study was to evaluate the performance of overland flow systems, especially during the winter months. Operation of the CRREL overland flow facility began in May 1977 and continued through the winter of 1977-78. The results of this study indicated that satisfactory BOD removal did not occur at soil temperatures below 4C. Based on this criterion, 105 days of storage would be needed at the CRREL site. This is 30 days less than the storage needs predicted by the EPA-1 computer program

MP 1153
GROWTH AND NUTRIENT UPTAKE OF FORAGE GRASSES WHEN RECEIVING VARIOUS APPLICATION RATES OF WASTEWATER.

raiazzo, A.J., et al. international symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampshire. Pro-ceedings, Vol.2, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.157-163, 10 refs.

McKim, H.L. 33-658

NUTRIENT CYCLE, SOIL CHEMISTRY, WASTE TREATMENT, GRASSES.

TREATMENT, URLANGED.

This study reports on the growth and nutrient removal of forage grasses receiving three years of wastewater applications. The forages received wastewater at various application rates and schedules and were grown in either a Windsor sandy loam or a Chariton silt loam soil. Plant and soil analyses were performed on representative samples during the study

MP 1154 MICROBIOLOGICAL AEROSOLS FROM A FIELD SOURCE DURING SPRINKLER IRRI-GATION WITH WASTEWATER.

GATION WITH WASTEWATER.

Bausum, H.T., et al., International Symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampshire. Proceedings, Vol.2, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.273-

Brockett, B.E., Schumacher, P.W., Schaub, S.A., McKim, H.L., Bates, R.E. 33-659

WASTE TREATMENT, WATER TREATMENT, IRRIGATION, AEROSOLS.

IRRIGATION, AEROSÓLS.

Measurements were made of the strength and dispersion of bacterial aerosols resulting from land application of chlorinated, ponded wastewater by spray irrigation. An approximately square 2.1 bectare area was covered by 96 impact sprinklers, thus creating a multi-point or field aerosol source. Visibetype and large volume electrostatic precipitator air samplers were deployed upwind and on 3 m centers in each of three downwind transects. In four runs, water to be aprayed was seeded with fluorescent dye to characterize the aerosol cloud without the effect of biological decay. During aerosol studies, continuous on-site meteorological measurements were made, and wastewater chemical parameters were monitored

COMPUTER PROCEDURE FOR COMPARISON OF LAND TREATMENT AND CONVENTIONAL TREATMENT: PRELIMINARY DESIGNS, COST ANALYSIS AND EFFLUENT QUALITY PRE-DICTIONS.

Spaine, P.A., et al, International Symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampshire. Proceedings, Vol.2, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.335-

340, 4 refs. Merry, C.J. 33-660

WASTE TREATMENT, WATER TREATMENT, COMPUTER PROGRAMS.

COMPUTER PROGRAMS.

During 1972 a manual for the design of wastewater treatment facilities was developed by the U.S. Army Engineer Waterways Experiment Station. To complement the design manual and assist the field design engineer, the computer model CAPDET (Computer Assisted Procedure for the Design and Evaluation of Wastewater Treatment Systems) was developed and implemented into CAPDET. The CAPDET program provides planning level design and cost evaluations for any wastewater treatment system.

MP 1156 SIMULATION OF THE MOVEMENT OF CON-SERVATIVE CHEMICALS IN SOIL SOLUTION. Nakano, Y., et al, International Symposium on the State of Knowledge in Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover, New Hampshire. Proceedings, Vol.2, Hanover, U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.371-380, 14-26. 380, 14 refs lskandar, I.K.

33-001 SOIL WATER MIGRATION, SOIL CHEMISTRY, MATHEMATICAL MODELS.

MATHEMATICAL MODELS.

A numerical method is introduced to simulate the movement of conservative chemicals in soil by water. The method is essentially based upon a finite element aproximation to the equation of continuity, and each element constitutes a complete mixing cell. The number of cells represents a degree of mixing. The theoretical justification of the method is presented and the accuracy of the method is examined, using experimental data obtained from a large lyaimeter. It is found that the method can simulate the general trend of the movement of chemicals reasonably well, but fails to simulate the high frequency of variations that occur near the soil surface.

MP 1157

TECHNIQUE FOR MEASURING RADIAL DEFORMATION DURING REPEATED LOAD TRIAXIAL TESTING.

Cole, D.M., Canadian geotechnical journal, Aug. 1978, 15(3), p.426-429, in English with French summary. 3 refs. 33-638

ELECTRICAL MEASUREMENT, DYNAMIC LOADS, DEFORMATION.

A system of non-contacting displacement transducers has been used to record radial deformation in repeated lead triansial tests. Operating principle, system capabilities, and installation technique are discussed. Results of tests on clay and silt subgrade materials are presented and Poisson's ratio is calculated directly from test data.

REPETITIVE LOADING TESTS ON MEMBRANE ENVELOPED ROAD SECTIONS DURING FREEZE-THAW CYCLES.

ING FREEZE-THAW CYCLES.
Smith, N., et al, American Society of Civil Engineers.
Geotechnical Engineering Division. Journal, Oct.
1978, 104(GT10), p.1277-1288, 15 refs. For other
versions of this paper see 32-562 (MP 962) and/or 324407 (CR 78-12, ADA-056 744).
Baton, R.A., Stubstad, J.
33-645

FREEZE THAW TESTS, ROADS, SUBGRADE PREPARATION, PROTECTIVE COATINGS, DY-NAMIC LOADS.

NAMIC LOADS.
Road test sections of impermeable membrane-enveloped silt and clay soils overlein with asphalt cement concrete were subjected to repetitive dynamic plate-bearing loadings to determine strength variations of the pavement systems during freeze-thaw cycles. The modulus values of the asphalt cement concrete vary inversely with its temperature by an order of magnitude in the temperature range of 110F to 30F. The resilient stiffness of the pavement system varied in the same manner by nearly a factor of eight. Despite the wide strength variations of the sections during freeze-thaw cycles, membrane enveloped fine-grained soils can be utilized instead of granular materials as base and subbase layers in flexible pavements in cold regions where moisture migration is a major concern. Without the membrane protection such fine-grained soils that experience frost heaving suffer severe bearing strength loss during thawing.

AMP 1156

MP 1159 PHYSICAL MEASUREMENTS OF RIVER ICE

JAMS. Calkins, D.J., Water resources research, Aug. 1978,

14(4), p.693-695, 5 refa. 33-641

RIVER ICE, ICE JAMS, MEASUREMENT, ICE COVER THICKNESS.

COVER THICKNESS.
River ice jam measurements have always been relatively difficult to obtain because of the uncertain stability of the floating ice mass. But recently two ice jams resolidified for about 3 weeks, allowing the ice thickness to be measured at several cross sections along their longitudinal profiles. The size distribution of surface ice floes in one of the jams was also evaluated from low-level serial photography. The ice jams were found to be thickest at the downstream end, of the order of 4-5 times the thickness of the ice cover before breakup, and decreased almost linearly in thickness upstream. The largest surface ice floes measured in one ice jam ranged from 0.27 to 0.05 of the river's average width (45m). The largest floes were at the downstream end, and floe size decreased progressively with distance upstream.

MP 1160

COMPUTER SIMULATION OF BUBBLER-IN-DUCED MELTING OF ICE COVERS USING EX-PERIMENTAL HEAT TRANSFER RESULTS.

Keribar, R., et al. Canadian journal of civil engineering, Sep. 1978, 5(3), p.362-366, In English with French summary. 9 refs. Tankin, R.S., Ashton, G.D.

33-1243

ICE MELTING, ARTIFICIAL MELTING, BUB-BLING, COMPUTERIZED SIMULATION.

BLING, COMPUTERIZED SIMULATION.
Results of laboratory experiments conducted to determine bubbler-induced heat transfer coefficients are reported. Implications and validity of results are discussed. As a second step, a procedure for computer-simulating the behavior of an ice aheet whose thickness is controlled by a bubbler system operating intermittently over a long period of time is developed. The simulation uses experimentally determined bubbler heat transfer coefficients, weather data, and characteristics, and desired performance as input data, and a finite difference method to solve the equations governing the ice thickness and temperature profile. Through an example simulation, the usefulness of the procedure in predicting ice thickness and temperature profile histories, and the effectiveness or suitability of a given bubbler system are demonstrated.

MP 1161

MP 1161

DECAY PATTERNS OF LAND-PAST SEA ICE IN CANADA AND ALASKA.

Bilello, M.A., Symposium on Sea Ice Processes and Models, Sep. 6-9, 1977. Proceedings, Vol.2, Seattle, University of Washington, 1977, p.1-10, 11 refs.

SEA ICE, FAST ICE, ICE COVER THICKNESS, DETERIORATION, METEOROLOGICAL FACTORS.

Weekly measurements of the thickness of land-fast sea ice made over a period of 10 to 15 years at a number of coestal locations in Canada and Alsaks were analyzed. That portion of the data relating to maximum ice thickness and decay (i.e., the decresse in ice thickness) are presented and examined. Many meteorological and marine factors affect the decay process. This study investigates the effects of two important weather elements; sir temperature and affect the decay process. This study investigates the effects of two important weather elements: air temperature and solar radiation. Complete and reliable air temperature data for each station made it possible to analyze the relationship between accumulated thawing degree-days (ATDD) and sea ice ablation. The relationship between ice decrease and

daily accumulated solar radiation was investigated; the results were comparable to those derived when ATDD was used as the dependent variable. Other factors affecting ice ablation and breakup, such as snow-ice formation, snow cover depth, and wind, are also discussed in the study.

NEARSHORE ICE MOTION NEAR PRUDHOE

BAY, ALASKA. Tucker, W.B., et al. Symposium on Sea Ice Processes and Models, Sep. 6-9, 1977. Proceedings, Vol.2, Seattle, University of Washington, 1977, p.23-31, 7

Weeks, W.F., Kovacs, A., Gow, A.J. 33-1394

SEA ICE, DRIFT, ICE TEMPERATURE, THER-MAL EXPANSION.

MAL EXPANSION.

Shorefast and nearshore pack ice motions in the vicinity of Frudhoe Bay, Alsaka, have been monitored for the spring seasons (March-June) of 1976 and 1977. From the base camp on Narwhal Island, a barrier island 25 km northeast of Frudhoe Bay, a ranging laser was used to measure distances to targets located on the fast ice within a 7 km radius of the island. To assess pack ice motions, a radar transponder system with tracking stations located on Narwhal and Cross Islands was used to monitor the positions of transponder system with tracking stations located on Narwhal and Cross Islands was used to monitor the positions of transponders placed on the pack ice as far as 37 km northeast of the islands. These results suggest that gyre movement or alippage of the nearshore pack ice in this area apparently does not begin until early to mid-summer. The pack ice in this area responds slowly, and only weakly to local winds. The mesoscale displacements that occurred took place only after several days of consistent offshore winds. This indicates that a significant shoreward stress originating in the more distant pack heavily influences the dynamics of this nearshore area.

MP 1163 CHARACTERIZATION OF THE SURFACE ROUGHNESS AND FLOE GEOMETRY OF THE SEA ICE OVER THE CONTINENTAL SHELVES OF THE BEAUFORT AND CHUKCHI SEAS.

Weeks, W.F., et al, Symposium on Sea Ice Processes and Models, Sep. 6-9, 1977. Proceedings, Vol.2, Seattle, University of Washington, 1977, p.32-41, 9

Tucker, W.B., Frank, M., Fungcharoen, S. 33-1395

SEA ICE DISTRIBUTION, SURFACE ROUGHNESS, SIDE LOOKING RADAR, PRESSURE

RIDGES.

This paper reports on observations primarily made during the late winter and early spring of 1976 when the ice cover was at its maximum extent, and very few leads were observed.

The primary sensors used were a laser profilomenter and an X-band side-looking airborne radar (SLAR) system. The heaviest ridging was found at Barter Island and there was a general decrease in the number of ridges as one moved west into the Chukchi Sea. There was no strong variation in the mean ridge height along the coast. moved west into the Chukchi Sea. There was no strong variation in the mean ridge height along the coast. There was no systematic areal variation in mean ridge height normal to the coast. There was also no correlation between mean ridge height and the number of ridges per km as has been reported by previous investigators. An analysis was also made of the probability of encountering very large ridges. SLAR imagery gives the size distribution of multiyear ice flocs within the nearthore ice pack, and the variation in the areal percentage of deformed ice as a function of distance from the coast. This latter parameter showed a steady the coast. This latter parameter show

MODELING PACK ICE AS A VISCOUS-PLAS TIC CONTINUUM: SOME PRELIMINARY RE-SULTS.

Hibler, W.D., III, Symposium on Sea Ice Processes and Models, Sep. 6-9, 1977. Proceedings, Vol.2, Seattle, University of Washington, 1977, p.46-55, 21 refa

PACK ICE, VISCOUS FLOW, PLASTIC FLOW, ICE DEFORMATION, ICE MODELS, MATHEMATICAL MODELS.

EMATICAL MODBLS.

A dynamic thermodynamic model of pack ice is presented, which treats the ice as a nonlinear viscous continuum characterized by both bulk and shear viscosities and a pressure term with the viscosities being functions of the deformation rate and the pressure. The pressure is parameterized as a function of the compactness and mean thickness of the ice. This formulation allows the viscous continuum approach to be retained while allowing the system to deform in a plastic manner. The model is formulated in a fixed Eulerian raid and the dynamical equations are compiled to confining plastic manner. The model is formulated in a fixed Eulerian grid, and the dynamical equations are coupled to continuity equations for compactness and mean ice thickness which include thermodynamic source and sink terms. In the numerical scheme the dynamical equations of motion, in finite difference form, are integrated implicitly and the ice thickness equations are integrated explicitly. The model is applied to the Arctic Basin and integrated at one-day steps for up to eight years in order to obtain steady state results for both ice thickness and drift. Two cases are

33-1399

MP 1165 FINITE ELEMENT FORMULATION OF A SEA ICE DRIFT MODEL.

Sodhi, D.S., et al, Symposium on Sea Ice Processes and Models, Sep. 6-9, 1977. Proceedings, Vol.2, Seattle, University of Washington, 1977, p.67-76, 10 refs. Hibler, W.D., III.

SEA ICE, DRIFT, MATHEMATICAL MODELS.

The complete boundary value problem of a linear viscous sea ice drift model is presented, using the finite element method; and the formulation includes the inertial force term method; and the formulation includes the imertial force term in the governing equation of motion. The results of the computations of the steady-state ice velocities in the Arctic Cocens are presented, using mean seasonal geostrophic wind data and available current information. The effect of varying boundary conditions and the viscosity parameters is examined. On a much smaller scale, this model has been applied to the study of non-steady drift of pack ice through the Strait of Belle lale (between Newfoundland and Labrador) where strong tids streams and ocean currents move the pack ice back and forth. Using idealized sinusoidal variations of the tidal streams at its found that the time lag between the water and the ice velocities is related to the viscosity parameters, which indicates that the ice is not drifting freely; and the boundaries affect the time constant of the simplified first order model of the ice drift through the Strait.

MP 1166

INVESTIGATION OF A VLF AIRBORNE RESISTIVITY SURVEY CONDUCTED IN NORTHERN

MAINE. Arcone, S.A., *Geophysics*, Dec. 1978, 43(7), p.1399-1417, 26 refs.

33-1573

ELECTRICAL RESISTIVITY, ABRIAL SURVEYS, VERY LOW FREQUENCIES, TOPOGRAPHIC EFFECTS, ELECTRIC FIELDS.

Arborne wavetilt resistivity surveys and profiles at VLP have been analyzed for the effects of topography, altitude, and wavetilt plases and amplitude. Topographic relief is known to affect at least one electric field component, flight altitude often varies over relief, and phase depends on the earth's resistivity stratification and the relative strength of the least the confidence of the control of the cont earth's resistivity stratification and the relative strength of displacement to conduction current. A mountainous area in northern Maine of predominantly slate, but containing an igneous stock, was surveyed at 150 m mean flight attitude. The 150-m survey was repeated at 300 m and two of the 150-m slight lines were repeated at a total of three other attitudes. A comparison of the 150-m survey with the topography and with the 300-m survey revealed that although most of the resistivity information of the 150-m survey was retained at 300 m, serious differences arose due to topographic influences. Profiles of the individual electric field components at the various altitudes then revealed that topography was topographic influences. Frofiles of the individual electric field components at the various altitudes then revealed that topography was distorting resistivity values through its effect upon only the vertical component of the electric field. The separate influences of phase and amplitude were analyzed using the results of a ground survey of the total, complex surface impedance. The phase of the tilt proved to be important in the airborne differentiation of the rock types.

MP 1167
USE OF REMOTE SENSING TO QUANTIFY
CONSTRUCTION MATERIAL AND TO DEFINE
GEOLOGIC LINEAMENTS, DICKEY-LINCOLN
SCHOOL LAKES PROJECT, MAINE.

***LINEAMENT AT AL International Symposium on

McKim, H.L., et al, International Symposium on Remote Sensing of Environment, 12th, Manila. Proceedings, 1978, 9 leaves, 7 refs. Merry, C.J., Blackey, B.A. 33-1584

REMOTE SENSING, CONSTRUCTION MATERIALS, GEOLOGIC STRUCTURES.

MATERIALS, GEOLOGIC STRUCTURES.

Pourteen surficial geology units were delineated in a 2850 at km area in northern Maine. These units included: alluvial fan, alluvial terrace, esker, floodplain, glacial moraine, kame, kame terrace, outwash, outwash terrace, bedrock, till, ill over bedrock, were outwash and wet till. The surficial geology units were field checked and then updated from the field reconsissance. The depths of the surficial geology units were estimated utilizing borehole data, field measurements and seismometer data. The areal extent of each surficial geology unit was quantified, using a planimetric color densitometer. The volumes of construction material were computed based upon these areal determinations and estimated depths. The volume estimates, compared with the estimates of required construction material, showed that more material could be found within the prescribed area around the dam and dike sites than was required for construction. It is believed that the east- and northeest-trending lineaments in this area are thrust faults dipping 45 deg to the northessts. The north-trending and N60W lineaments are probably strike-slip normal and reverse faults dipping 80 deg to nearly vertical. Future movement along these faults should be negligible.

MP 1148 CREEP RUPTURE AT DEPTH IN A COLD ICE

Colbeck, S.C., et al. Nature, Oct. 26, 1978, 275(5682), p.733, 13 refs. St. Lawrence, W.F., Gow, A.J.

ICE SHEETS, ICE CREEP, FRACTURING, SEIS-MIC SURVEYS.

MIC SURVEYS.

Experimental evidence has not supported the hypothesis that tectonic processes operating within glaciers and ice sheets are analogous to those in the Earth. However, evidence of the existence of discrete shear planes within the antarctic ice sheet (31-1071 or F-17742) and evidence described here relating to the Greenland ice sheet indicate that faulting takes place at depth in cold ice sheets. The evidence suggests reconsideration of the concept of correspondence between flow and rupture at depth in the Earth and in cold ice sheets, as suggested earlier. Direct investigations at depth in ice sheets are made with relative ease as compared to the nearly impossible task of direct measurements in the Earth's mantle.

MP 1169 EFFECT OF INUNDATION ON VEGETATION AT SELECTED NEW ENGLAND FLOOD CON-TROL RESERVOIRS.

McKim, H.L., et al, Symposium on Remote Sensing for Vegetation Damage Assessment, February 1978. Proceedings, 1978, 13p., 13 refs. Gatto, L.W., Merry, C.J., Cooper, S.

REMOTE SENSING, INFRARED PHOTOGRA-PHY, VEGETATION PATTERNS, DAMAGE, PHY, VEGE FLOODING.

PLOODING.

The effect of inundation on vegetation caused by the regulation and impoundment of water at six New England flood control reservoirs during a June-July 1973 flood was assessed from color infrared photography and corroborative ground surveys. Percent of damaged trees was assessed on a pattern recognition and coloration basis. Correlative ground truth data showed that the deciduous trees, particularly silver maple and red oak, were least affected and that coniferous trees, especially white pine, were most affected by siltation and inundation. Much of the understory vegetation, i.e., American and Eastern hop hornbeam, lost all leaves after inundation, but new buds and shoots appeared by late September 1973. A critical relationship, determined from ground transect profiles tho "ing the relationship between species usceptibility and inundation time, was that trees completely covered by flood waters for more than 90 hours showed the most apparent damage.

damage.
MP 1170
INVESTIGATION OF ICE CLOGGED CHANNELS IN THE ST. MARYS RIVER.
Mellor, M., et al, U.S. Coast Guard. Report, Mar.
1978, USCG-D-22-78, 73p., ADA-058 015.
Vance, G.P., Wuebben, J.L., Frankenstein, G.E.

ICE BREAKING, ICE JAMS, CHANNELS (WATERWAYS), COST ANALYSIS.

This study addresses itself to the problem of removing brash ice from Prochette Point to Six-Mile Point of the Little Rapids Cut of the St. Marys River system. The area and river system are described and estimates are made for partially clearing a channel 250 ft wide. Rough costs, based on dollars per horsepower, indicate that it would cost between 1 and 2 million dollars per clear channel mile per year.

MP 1171 DIELECTRIC PROTERTIES OF DISLOCA-TION-FREE ICE.

Itagaki, K., Journal of glaciology, 1978, 21(85), p.207-217, In English with French and German summaries. 20 refs.

ICE CRYSTALS, HOARFROST, DISLOCATIONS (MATERIALS), ICE ELECTRICAL PROPERTIES. MATERIALS), ICE BLECTRICAL PROPERIES.
Delectric properties of dislocation-free host-frost ice crystals
were measured in the audio-frequency range. Anomalously
small relaxation strength was found in the dislocation-free
ares of the crystal samples, while dislocations deliberately
introduced by scratching the samples drastically modified
the relaxation strength. Since measurements made in the
ares of high dislocation density indicated normal behavior,
electrically charged dislocations are considered to be the
source of the normally observed dielectric relaxation.

MP 1172 REGELATION AND THE DEFORMATION OF

WET SNOW. Colbeck, S.C., et al, Journal of glaciology, 1978, 21(85), p.639-650, in English with French and Ger-man summaries. 17 refs.

Parssinen, N. 33-1901

WET SNOW, REGELATION, SNOW DEFORMA-TION, MODELS.

The thermodynamics of phase equilibrium control the temperature distribution around the ice particles in wet snow. When the snow is stressed, pressure melting occurs at the interparticle contacts and the snow densities. Densification

is described by a physical model which simulates the heat flow, meltwater flow, and particle geometry. The effects of ionic impurities, liquid saturation, and particle size are demonstrated. Typical values of the temperature difference, inter-particle film size, and density are calculated as functions of time. The calculated rates of compaction are too large; hence, at some later time, the effects of simultaneous grain growth must be added to the model.

FUNDAMENTALS OF ICE LENS FORMATION. Takasi, S., American Institute of Chemical Bugineers.
AICHB symposium series, 1978, 74(174), p.235-242,
27 refs. See also 32-3470 and 32-4368.

ICE LENSES, ICE FORMATION, SOIL WATER, SOIL FREEZING, HEAT TRANSFER, FROST HEAVE, ANALYSIS (MATHEMATICS).

HEAVE, ANALYSIS (MATHEMATICS). A new concept of the freezing of water, called aggregation freezing, is proposed to explain the creation of the suction force that draws pore water up to the interface of a growing ice lens. The temperature of segregation freezing is shown to be lower than that of normal freezing (in situ freezing). This difference determines the pressure that the ice lens sexerts while growing and carrying the overlying weight. On the assumption that the soil structure is rigid, equations governing the simultaneous flow of heat and water are formulated and solved for the limit of time t to 0 with the combination of analytical and numerical methods. Numerical computation of the solution yields a result that is reasonable, compared with experience in laboratory and nature.

MP 1174 ISUA, GREENLAND: GLACIER FREEZING STUDY.

AICHE symposium series, 1978, 74(174), p.256-264, 9 refs. 33-2086

GLACIER FLOW, CREEP, ICE REFRIGERA-TION, MINING, DRILLING, ANALYSIS (MATH-EMATICS), ICE TEMPERATURE.

TION, MINING, DRILLING, ANALYSIS (MATH-EMATICS), ICE TEMPERATURE.

A scheme for cooling the lower portion of the edge of the Greenland ice sheet, which abuts a potential mining operation is examined. At the mine site, the ore body is overlain with ice. Once the overburden is removed, however, the adjacent ice is expected to flow toward the pit. One possible means of slowing this movement is to cool the ice below its present temperature to achieve a reduction in the creep rate and a retardistion of basal slip. The present study examines analytically the magnitude of cooling which may be accomplished by drilling a series of vertical holes about the periphery of the mine site. Refrigaration is accomplished by pumping a coolant downhole in a central pipe, then uphole in an annulus between the pipe and hole wall, and then through a thin walled pipe exposed to the cold surface climate above the ice sheet. Results of example calculations for various particular combinations of the free parameters are examined and include cooling requirements, hold spacing, pump requirements, and other parameters. Over a period of operation on the order of a year of more, it appears possible to cool a substantial part of the lower area of the glacier on the order of 1 to -2C, using a hole spacing that is considered reasonable. The results of the study are to be used as input to a detailed glacier flow study.

REMOTE DETECTION OF MASSIVE ICE IN PERMAPROST ALONG THE ALYESKA PIPE-INE AND THE PUMP STATION FEEDER GAS PIPELINE.

Kovacs, A., et al, ASCE Pipeline Division Specialty Conference, New Orleans, Louisians, Jan. 13-17, 1979. Proceedings. Pipelines in adverse environ-ments; a state of the art, Vol.1, New York, N.Y., American Society of Civil Engineers, 1979, p.268-279,

Morey, R.M. 33-2077

59-201 PERMAFROST STRUCTURE, PERMAFROST PHYSICS, ICE DETECTION, SUBSURFACE INVESTIGATIONS, REMOTE SENSING, RADAR ECHOES, GROUND ICB, ICE FORMA-TION, SOUNDING, REFLECTIVITY, LINES.

LINES.
Field soundings using an impulse radar system were carried out during May 1976 along a section of the Alyeska Pipeline near Pump Station 3 and the pump station feeder gas pipeline trench near the Happy Velley Camp, Alaska. The radar system, operating on the ground, provided a continuous profile of the near-surface geological structure of the permafrost. A unique dual antenna configuration produced two profiles, a vertical profile and an offset profile, from which the velocity of the radar signal at any point along the traverse could be calculated and from which a representative depth scale for the subsurface profile was determined. The profile results proved useful in identifying regions of massive ice in the permafrost. Logs from holes drilled for the oil pipeline's Vertical Support Members are compared with the radar profile data. This comparison shows that the radar detected the top and bottom of massive ice to a depth of approximately 30 ft.

MP 1176 RESILIENT RESPONSE OF TWO FROZEN AND THAWED SOILS.

AND IRLAWED SUILS.

Chamberlain, E.J., et al, American Society of Civil Ragineers. Geotechnical Engineering Division.

Journal, Feb. 1979, 5(GT2), p.257-271, 13 refs.

Cole, D.M., Johnson, T.C.

33-2178 SUBGRADE SOILS, SEASONAL PREEZE THAW, SOIL MECHANICS, STRESSES, LOW TEMPERA-TURE TESTS.

TURE TESTS.

Values of resilient modulus and Poisson's ratio were determined for silt and clay subgrade materials subjected to seasonal freezing and thawing. A new tachnique employing noncontacting variable impendance transducers was employed to obtain radial strain data for calculation of Poisson's ratio. The data were analyzed using multiple linear regression and analysis of variance techniques to obtain empirical relationships between the resilient moduli and Poisson's ratio parameters and stress and material property variables. Resilient modulus data ranged from over 6,000,000 psi for the frozen condition to less than 600 psi for the chawed condition. Poisson's ratio ranged from 0.07 to 0.61, the majority of the values falling between 0.03 and 0.50.

MP 1177 OXYGEN ISOTOPE INVESTIGATION OF THE ORIGIN OF THE BASAL ZONE OF THE MATA-NUSKA GLACTER, ALASKA. Lawson, D.E., et al, Journal of geology, 1978, Vol.86,

p.673-685, 34 refs. Kulla, J.B.

GLACIER ICE, ICE STRUCTURE, OXYGEN ISO-TOPES, THERMODYNAMIC PROPERTIES.

An analysis of the oxygen isotope content of ice of the englacial and basal zones of the Matanuska Glacier at its terminus reveals the origin of the ice and entrained debris. The decrease with depth in the change of 018 values of ice of the diffused facies of the englacial zone and the new occrease with depth in the change of O18 values of the dispersed facies of the basal zone is consistent with previous studies and indicates this ice originates in the accumulation area. Characteristics of the ice and debris of the dispersed facies indicate a subglacial source for most of the debris. The sharp increase of more than 4 per mill in the change of O18 values of ice of the lower, stratified facies of the basal zone and its young radiocarbon age indicate this facies formed by subglacial freezing of isotopically enriched meltwater, probably surface-derived, to the glacier sole. The bubble-poor, fine-grained ice, thickness, stratification, rounded pebbles, and undisturbed sedimentary structures in this facies support this conclusion. The location, extent, and rates of subglacial ice formation and sediment entrainment vary. The Matanuaka Glacier is therefore thermally complex, with zones of ice at the glacier sole that are at or below the pressure-melting point.

MP 1178

RIVER ICE.
Ashton, G.D., American scientist, Jan./Feb. 1979, 67(1), p.38-45, 21 refs.

RIVER ICE, ICE FORMATION, ICE JAMS, ICE GROWTH, THERMAL POLLUTION, TEMPERATURE EFFECTS.

MP 1179 MEASUREMENT OF MESOSCALE DEFORMA-TION OF BEAUFORT SEA ICE (AIDJEX-1971).
Hibler, W.D., III, et al. Problems of the Arctic and the
Antarctic; collection of articles, 1978, Vol.43-44,
p.148-172, TT-75-52082, For Russian version see 292023. 21 refs.

Weeks, W.F., Ackley, S.F., Kovacs, A., Campbell, 33-2376

PACK ICE, ICE DEFORMATION, DRIFT, AERI-AL SURVEYS, ICE REPORTING.

ORIGIN AND PALEOCLIMATIC SIGNIFI-CANCE OF LARGE-SCALE PATTERNED GROUND IN THE DONNELLY DOME AREA, ALASKA.

Pewe, T.L., et al. Geological Society of America. Special paper, 1969, No.103, 87p., Bibliography p.79-84. In English with French, German, and Russian

Church, R.E., Andresen, M.J.

PATTERNED GROUND, SEDIMENTS, GLACIAL PROCESSES, ICE WEDGES, PERMA-FROST, UNITED STATES—ALASKA—DON-FROST, UNIT

MP 1181 HYDRAULIC TRANSIENTS: A SEISMIC SOURCE IN VOLCANOES AND GLACIERS. St. Lawrence, W.F., et al, Science, Feb. 16, 1979, 203(4381), p.654-656, 10 refs. SEISMIC

WAVE PROPAGATION, GLACIERS, VOL-CANOES, EARTHQUAKES.

A source for certain low-frequency seismic waves is postulated in terms of the water hammer effect. The time-dependent displacement of a water-filled subglacial conduit is analyzed to demonstrate the nature of the source. Preliminary energy calculations and the observation of hydraulically generated seismic radiation from a dam indicate the plausibility of the proposed source.

MP 1182 TERMINAL BALLISTICS IN COLD REGIONS MATERIALS

MATERIALS.

Aitken, G.W., International Symposium on Ballistics, 4th. Proceedings, Monterey, California, U.S. Naval Postgraduate School, 1978, 6p., 11 refs.

33-2729
PROJECTILE PENETRATION, PENETRATION TESTS, FROZEN GROUND, SNOW COVER. In a winter environment, snow and frozen soil may be the most readily available materials for use in field fortifications. Design of effective fortifications requires detailed knowledge of the response of these materials to impact from projectiles and projectile fragments. Data for small arms projectile and simulated projectile fragments and projectile and simulated projectile fragments, and the prediction made using both closed form and empirical solutions are compared with test results, and the prediction techniques are discussed. Besic agreement between predicted and measured penetrations was obtained for the simulated projectile fragments, which tended to remain stable in the target materials. Penetration of 7.62 mm small arms projectiles into frozen soil targets is also predictable at velocities below about 600 m/s, above which they tend to become unstable and tumble in the target. In the case of the empirical solution, the results presented serve to extend its range of applicability to projectiles weighing less than 0.9 kg.

MP 1183

MP 1183

INTRODUCTION TO THE WORESHOP ON ECOLOGICAL EFFECTS OF HYDROCARBON SPILLS IN ALASKA.

Atlas, R.M., et al, Arctic, Sep. 1978, 31(3), p.155-157. Brown, J.

33-2786 MEETINGS, OIL SPILLS, RESEARCH PRO-

MP 1184 EFFECTS OF CRUDE AND DIESEL OIL SPILL ON PLANT COMMUNITIES AT PRUDEHOE BAY, ALASKA, AND THE DERIVATION OF OIL

SPILL SENSITIVITY MAPS. Walker, D.A., et al, Arctic, Sep. 1978, 31(3), p.242-259, In English with French summary. 29 refs. Webber, P.J., Everett, K.R., Brown, J. 33-2793

OIL SPILLS, ENVIRONMENTAL IMPACT, TUNDRA VEGETATION, INDEXES (RATIOS), MAPS.

MAPS.
Crude oil was spilled on six of the major Prudhoe Bay plant communities at an intensity of 12 liters/sq m. The communities occurred along a topographic-moisture gradient. The reaction of the major species of the various communities was recorded one year following the spills. Sedges and willows showed substantial recovery from crude oil spills. Mosses, lichens, and most dicotyledons showed little or no recovery. On a very wet plot with standing water, the vegetation showed very poor recovery. Dryss integrifolis M. Vahl, the most important vascular species on dry sites, was killed. Identical experiments using diesel oil rather than crude oil showed all species except an aquatic most to be killed. A sensitivity index for the communities was calculated on the beais of the percentage cover of the resistant species divided by the original total plant cover of the community. With this information an oil spill sensitivity map for an area of Prudhoe Bay was constructed data from Prudhoe Bay together with some from the literature, a predictive sensitivity map was also constructed for an socidental crude oil spill at nearby Franklin Bluffs. In this example all the community types are considered to have moderate to excellent recovery potential.

MP 1185 PHYSICAL, CHEMICAL AND BIOLOGICAL EF-FECTS OF CRUDE OIL SPILLS ON BLACK SPRUCE FOREST, INTERIOR ALASEA. Jenkins, T.F., et al, Arctic, Sep. 1978, 31(3), p.305-323, 36 refs.

Johnson, L.A., Collins, C.M., McFadden, T. 33-2797

OIL SPILLS, ENVIRONMENTAL IMPACT, FOR-EST TUNDRA, VEGETATION, DAMAGE.

MP 1186 FATE OF CRUDE AND REFINED OILS IN NORTH SLOPE SOILS.

Senstone, A., et al. Arctic, Sep. 1978, 31(3), p.339-347, In English with French summary. 6 refs. Everett, K.R., Jenkins, T.F., Atlas, R.M. 32-2709

OIL SPILLS, TUNDRA SOILS, HYDROCAR-BONS, MICROBIOLOGY.

BONS, MICROBIOLOGY.

Prudhoe Bay crude oil and refined diesel fuel were applied to five topographically distinct tundra soils at Prudhoe Bay, Alaska. The penetration of hydrocarbons into the soil column depended on soil moisture and drainage characteristics. Biodegradation, shown by changes in the pristane to heptadeone and resolvable to total gas chromatographic area ratios, appeared to be greatly restricted in drier tundra soils during one year exposure. Some light hydrocarbons were recovered from soils one year after spillages. Hydrocarbons were still present in soils at Fish Creek, Alaska, contaminated by refined oil spillages 28 years earlier, attesting to the persistence of hydrocarbons in North Slope soils.

MP 1187 STUDY OF SEVERAL PRESSURE RIDGES AND ICE ISLANDS IN THE CANADIAN BEAUFORT

Hinatiuk, I., et al, Journal of glaciology, 1978, 20(84), p.519-532, In English with French and German summaries. 3 refs. Kovacs, A., Mellor, M. 33-2885

PRESSURE RIDGES, ICE ISLANDS, ICE COVER THICKNESS, PROFILES.

THICKNESS, PROFILES.

The environmental conditions in the southern Beaufort Sea are described, with special emphasis on pressure ridges and ice islands. Techniques for determining the geometric configurations and the physical and mechanical properties of sea-ice structures and ice islands are described. Forfiles of pressure ridges were determined by surface surveys, drill-hole probes and side-looking sonar scanning. Multi-year pressure ridges with thicknesses up to 20 m and widths up to 120 m were examined in detail. The first-year ridge of 22 m thickness and 100 m width was studied. Results are given for several multi-year and the first-year ridges. Information obtained from dives under the ice is also given. Corresponding data are given for grounded in 15 m of water was one of several investigated. Measurements of temperature, salinity, tensile strength, and compressive strength are given for ice taken from old pressure ridges; and factors influencing the interpretation of test data are discussed.

FULL-DEPTH PAVEMENT CONSIDERATIONS

IN SEASONAL FROST AREAS.

Eaton, R.A., et al, U.S. Army Cold Regions Research and Engineering Laboratory, Feb. 1979, 24p., 8 refs. Paper presented at the annual meeting of the Association of Asphalt Paving Technologists, Denver, Colorado, Feb. 15-17, 1979.

Joubert, R.H. 33-3004

33-2904 BITUMINOUS BITUMINOUS CONCRETES, SEASONAL FREEZE THAW, FROST RESISTANCE, FROST PENETRATION, SUBGRADE PREPARATION, PROST HEAVE.

FROST HEAVE.

Two full-depth pavement sections were built on highly frostsuaceptible subgrades that had been properly prepared. Suitable structural and service performances were achieved in
spite of substantial, though uniform, frost heaves. A fulldepth pavement built on a local municipal street has not
approached structural failure. However, poor service performance caused by differential heaves and severe differences
at surface castings has resulted. This paper reports on
these studies and attempts to underscore the importance
of proper design and construction of pavements on highly
frost-susceptible soils. Particular emphasis is placed on
the quality of subgrade preparation.

Finally, the incorporation of transition sections at surface castings is considered
necessary to diminish differential heave at the castings.

MP 1189 DESIGN OF AIRFIELD PAVEMENTS FOR SEASONAL FROST AND PERMAPROST CONDI-TIONS.

Berg, R.L., et al, U.S. Army Cold Regions Research and Engineering Laboratory, Oct. 1978, 18p., Present-ed at the U.S. Air Force Worldwide Pavements Conference, Panama City Beach, Florida, Oct. 24-26, 1978.

Johnson, T.C. 33-2905

AIRPORTS, BITUMINOUS CONCRETES, SUB-GRADE PREPARATION, SEASONAL FREEZE THAW, FROST PENETRATION, FROST HEAVE. MP 1190 SINTERING AND COMPACTION OF SNOW

CONTAINING LIQUID WATER. Colbeck, S.C., et al, *Philosophical magazine A*, Jan. 1978, 39(1), p.13-32, Refs. p.31-32. 33-2982

SNOW COMPACTION, SNOW MECHANICS, FIRNIFICATION, ICE DENSITY, SALINITY, MELTWATER, WET SNOW.

ELEMENTAL ANALYSES OF ICE CRYSTAL NUCLEI AND AEROSOLS.

Kumai, M., International Conference on Atmospheric Aerosola, Condensation and Ice Nuclei, 9th, Galway, Ireland, Sep. 21-27, 1977. Proceedings, Galway, Ire-land, University College, 1977, 5p., 11 refs.

ICE NUCLEI, AEROSOLS, ELECTRON MICROS-COPY, X RAY ANALYSIS.

lice crystal nuclei and serosola in Pairbanks, Alaska were studied using a scanning electron microscope and energy-dispersive X-ray analyzer. It is thought that the origina of the ice nuclei and aerosola are mainly solid combustion by products from local electric power plants and other combustions.

ICE FOG SUPPRESSION USING THIN CHEMI-

ICE PUG SUFFERMANDER CAL FILMS.

CAL FILMS.

McFadden, T., et al, U.S. Environmental Protection
Agency. Report, Jan. 1979, EPA-600/3-79-007, Collins, C.M.

33-2959 ICE FOG, FOG DISPERSAL, CHEMICAL REAC-TIONS.

TIONS.

Toe fog suppression experiments on the Fort Wainwright Fower Plant cooling pond were conducted during the winter of 1974-76. Hexadecanol was added to the pond and dramatically improved visibility by reducing fog generated from water vapor released by the pond at -14C. Although this temperature was not low enough to create ice fog. the cold vapor fog created was equally as devastating to visibility in the vicinity of the pond. During the winter of 1975-76, suppression tests were continued using films of hexadecanol, mixes of hexadecanol and octadecanol, and ethylene glycol monobutyl ether (BGMB). Suppression effectiveness at colder temperatures was studied and limits to the techniques were probed. A reinforcing grid was constructed that prevented breakup of the film by wind and water currents. Lifetime tests indicated that BGMB degrades much more slowly than either hexadecanol or the hexadecanol-octadecanol mix. All the films were found to be very effective fog reducers at warmer temperatures but still allowed 20% to 40% of normal evaporation to occur. The vapor thus produced was sufficient to create some ice fog at lower temperatures, but this ice fog occurred less frequently and was more quickly dispersed than the thick fog that was present before application of the films.

MP 1193 PROCEEDINGS.

Colloquium on Planetary Water and Polar Processes, 2nd, Hanover, N.H., Oct. 16-18, 1978, Hanover, N.H., U.S. Army Cold Regions Research and Engineering Laboratory, 1978, 209p., For selected papers see 33-3058 through 33-3080.

MEETINGS, MARS (PLANET), PLANETARY ENVIRONMENTS, PERMAPROST HYDROLO-GY, GEOLOGIC STRUCTURES, WATER.

DEVELOPMENT OF A SIMPLIFIED METHOD FOR FIELD MONITORING OF SOIL MOIS-

Walsh, J.E., et al, Colloquium on Planetary Water and Polar Processes, 2nd, Oct. 1978. Proceedings, Hanover, N.H., U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.40-44, Includes comments. 3 refs.

McQueeney, D., Layman, R.W., McKim, H.L.

SOIL WATER, MEASURING INSTRUMENTS, ELECTRIC EQUIPMENT.

VIKING GCMS ANALYSIS OF WATER IN THE MARTIAN REGOLITH.

Water and Polar Processes, 2nd, Oct. 1978. Proceedings, Hanover, N.H., U.S. Army Cold Regions Research and Engineering Laboratory, 1978, p.55-61, Includes comments. 7 refs. Tice, A.R. 33-3060

GROUND WATER, MARS (PLANET), SOIL TESTS, GAS INCLUSIONS.

ICE BLOCKAGE OF WATER INTAKES.

Carey, K.L., U.S. Nuclear Regulatory Commission. Contractor report, Mar. 1979, NUREG/CR-0548, 27p., 19 refs. 33-3113

WATER INTAKES, FRAZIL ICE, BOTTOM ICE.

ICE COVER.

Los blockage of water intake structures can pose serious threats to the availability of cooling water at thermal power plants. Ice blockage difficulties are described as they may occur in rivers, lakes, reservoirs, and estuaries, and as they may affect intakes either at the surface or submerged. Characteristics of both surface sheet ice and frazil ice are examined: formational processes, sizes, thicknesses, movement or mobility, and modes of blockage or adhesion. Case histories of incidents of ice blockage or adhesion. Case histories of incidents of ice blockage of intakes are given. Solving ice blockage problems, either through original design, post-construction modification, or revised operational techniques is discussed.

MFP 11428

MP 1198 EFFECT OF THE OCEANIC BOUNDARY LAYER ON THE MEAN DRIPT OF PACK ICE: APPLICATION OF A SIMPLE MODEL

McPhee, M.G., Journal of physical oceanography, Mar. 1979, 9(2), p.388-400, 14 refs. For this paper from another source, see 32-4551. 33-3216

PACK ICE, DRIFT, BOUNDARY VALUE PROB-LEMS, MATHEMATICAL MODELS, ICE WATER INTERFACE.

WATER INTERFACE.

Smoothed records of ice drift, surface wind and upper ocean currents at four manned stations of the 1975-76 AIDJEX experiment in the central Arctic have been analyzed to provide a statistical relationship between stress at the ice-cean interface and ice-drift velocity during a 60-day period when the ice was too weak to support internal forces. Resential features of the model are dynamic scaling for velocity, kinematic stress and length, with exponential attenuation of a linear dimensionaless eddy viscosity. Currents measured 2 m below the ice confirmed the shape of the stress vs ice speed curve and provided an estimate of the angle between surface stress and velocity. The model was used to qualitatively estimate the effect of a pycnocline at 25 m on surface characteristics. The observed behavior when stratification at that level was most pronounced tended toward slightly higher drag at higher speeds, which is qualitatively consistent with the model results.

MP 1199

MP 1100 CURRENT RESEARCH ON SNOW AND ICE RE-MOVAL IN THE UNITED STATES.

Minak, L.D., Neve international, Sep. 1978, 20(3).

p.21-22. 33-3272

35-32/2 SNOW REMOVAL, ICE REMOVAL, ICE CON-TROL, CHEMICAL ICE PREVENTION, ICE PRE-VENTION.

MP 1200

DYNAMICS OF NEAR-SHORE ICE.

Kovaca, A., et al, Environmental assessment of the Alaskan continental shelf, Vol. 3. Principal investigations' quarterly reports for the period July-September 1977, Boulder, Colorado, Environmental Research Laboratories, 1977, p.503-510, PB-279 913.

Weeks, W.F.

33-3323

PACK ICE, DRIFT, RADAR ECHOES, ICE COVER THICKNESS, ICE DEFORMATION, DATA PROCESSING.

MP 1201

DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAPROST BENEATH THE BEAUFORT SEA

Selimann, P.V., et al, Environmental assessment of the Alaskan continental shelf, Vol.3. Principal investigators' quarterly reports for the period July-September 1977, Boulder, Colorado, Environmental Research Laboratories, 1977, p.518-521, PB-279 913. Brown, J., Blouin, S.E., Chamberlain, E.J., Iakandar, JK Lieda H.T.

I.K., Ueda, H.T. 33-3324

SUBSEA PERMAFROST, DRILL CORE ANAL-YSIS.

MP 1202 ULTRASONIC MEASUREMENTS ON DEEP ICE CORES FROM ANTARCTICA.

Gow, A.J., et al, Antarctic journal of the United States, Oct. 1978, 13(4), p.48-50, 3 refs.

33-3350

ICE CORES, ULTRASONIC TESTS, ICE CRYSTAL STRUCTURE, ANTARCTICA—BYRD STA-TION.

This report discusses some results of recent measurements of ultrasonic velocities performed on ice cores collected in 1968 at Byrd Station. The analytical technique is described it is concluded that measurement of ultrasonic velocities

of cores from deep drill holes enables monitoring of the relation characteristics of the cores and determination of the gross trends of c-axis orientation in the ice sheet. Supplemented by optical thin section, studies can verify the exact nature of the fabric at any given depth and any inclination of the fabric symmetry axis with respect to the direction of propagation of P-wave velocity.

MP 1203 SEA ICE AND ICE ALGAE RELATIONSHIPS IN THE WEDDELL SEA.

Ackley, S.P., et al, Antarctic journal of the United States, Oct. 1978, 13(4), p.70-71, 7 refs. Taguchi, S., Buck, K.R.

33-3363 SEA ICE, PACK ICE, ALGAE, CRYOBIOLOGY, ICE BREAKUP, CHEMICAL COMPOSITION, WEDDELL SEA.

Analysis of data obtained during a 1977 cruise in the Weddell Sea indicates that the ice algal community found during that cruise is distinct from others that have been described sea minimizes that he to easily community toward unring that cruise is distinct from others that have been described (for example, the bottom epontic communities in the landstatic in McMurdo Sound, the surface communities off East Antarctics, and the bottom communities in Arctic Pack icc.) Unlike these other communities, the Weddell pack algae is dominantly an interior one, existing not at the surface or bottom but at mid-depth (65 to 2.15 m) within the icc. The formation of this community is dependent on the unique thermal and physical setting for Weddell pack icc. Brine drainage processes are initiated by summer warming, but are not carried through to completion as in the Arctic. This process causes a redistribution of salinity, maximizing in the mid-depth regions of the ice and apparently leading to algae production because of the relatively higher nutrient levels at those mid-depth. A qualitative model indicating the relationship between the thermally induced brine migration and subsequent algae growth is given.

ENVIRONMENTAL ATLAS OF ALASKA. Hartman, C.W., et al, Fairbanks, University of Alaska, 1978, 95p., 2nd ed. For 1st ed. see 24-4007. 44 refs. Johnson, P.R. 33-3460

SEA WATER, RIVERS, CLIMATE, INDEXES (RATIOS), PHYSICAL PROPERTIES, UNITED STATES—ALASKA.

MP 1205

DYNAMICS OF NEAR-SHORE ICE.

Kovacs, A., et al, Environmental assessment of the Alaskan continental shelf, Vol. 11, Hazards. Principal investigators' annual reports for the year ending March 1978. Boulder, Colorado, Outer Continental Shelf Environmental Assessment Program, 1978, p.11-22. Weeks, W.F. 33-3591

SEA ICE, DRIFT, ICE COVER THICKNESS, RADAR ECHOES, ICE STRUCTURE, PRESSURE RIDGES.

DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAFROST BENEATH THE BEAUFORT SEA

Sellmann, P.V., et al, Bnvironmental assessment of the Alaskan continental shelf, Vol. 11, Hazards. Principal investigators annual reports for the year ending March 1978. Boulder, Colorado, Outer Continental Shelf Environmental Assessment Program, 1978, p.50-74.

Chamberlain, E.J.

33-3593

SUBSEA PERMAPROST, BOTTOM SEDIMENT, BOREHOLES, TEMPERATURE MEASURE-MENT.

MENT.

Observations include determinations of subsea sediment temperature, type, ice content, and chemical composition. These data, coupled with geophysical studies and results from other Beautort Ses geological studies, are being used jointly to ascertain subsea permafrost distribution. This report includes a summary of the spring 1977 field program and a general summation of the results from two years of field study in the Prudhoe Bay area. The 1977 field study produced six additional drilled and sampled holes plus 27 probe sites which yielded both material property and temperature data. The field observations and the results of laboratory analyses of the samples help to demonstrate the complex nature of subsea permafrost.

MP 1207 MECHANICAL PROPERTIES OF POLYCRYS-TALLINE ICE: AN ASSESSMENT OF CURRENT KNOWLEDGE AND PRIORITIES FOR RE-

Hooke, R.L., et al, [1979], 16p., Report of the International Commission on Snow and Ice/National Science Foundation working group on ice mechanics.
Mellor, M., Jones, S.J., Martin, R.T., Meier, M.F., Weertman, J. 33-3545

ICE MECHANICS, ICE CRYSTALS, ICE CREEP, ICE DEPORMATION, STRAIN TESTS, STRESS STRAIN DIAGRAMS, ICE STRENGTH.

PROJECTED THERMAL AND LOAD-AS-SOCIATED DISTRESS IN PAVEMENTS IN-CORPORATING DIFFERENT GRADES OF AS-PHALT CEMENT.

Johnson, T.C., et al, Association of Asphalt Paving Technologists. Technical sessions. Proceedings, 1979, Vol.48, p.403-437, 35 refs. Shahin, M.Y., Dempsey, B.J., Ingersoll, J.

33-3865

BITUMINOUS CONCRETES, BITUMENS, LOW TEMPERATURE TESTS, FROST HEAVE, CRACKING (FRACTURING), THERMAL STRESSES, TEMPERATURE EFFECTS.

MP 1210

PHASE COMPOSITION MEASUREMENTS ON SOILS AT VERY HIGH WATER CONTENTS BY PULSED NUCLEAR MAGNETIC RESONANCE

Tice, A.R., et al, Transportation research record, 1978, No.675, p.11-14, 22 refs.
Burrous, C.M., Anderson, D.M.
33-3863

FROZEN GROUND PHYSICS, UNFROZEN WATER CONTENT, NUCLEAR MAGNETIC RESONANCE, SOIL CHEMISTRY, SALINE SOILS.

SOILS.

A simple, rapid method of determining the unfrozen water content of frozen soils is described in detail. The method uses the first pulse simplitude of a pulsed nuclear magnetic resonance analyzer. Phase composition curves were obtained for four soils at very high total water contents. Three of the soils (Manchester fine sand, Rairbanks silt, and Goodrich clay) had been previously examined by another method (sothermal calorimeter). The fourth (Kotzebue silt) is a naturally saline soil found in low-lying coastal regions of Alaska. This soil was tested both in its natural state and with the soluble salts removed. The phase composition curves obtained by the nuclear magnetic resonance method are consistent with those obtained by using the isothermal calorimeter, but the nuclear magnetic resonance method aved time, requiring only 48h. It also provides a high degree of reproducibility and can be used over a wide range of temperatures. As expected, the unfrozen water content of the saline soil was much higher in its natural state than after removal of the soluble salts. In addition, the unfrozen water content of all four soils appears to increase somewhat as the total water content of the sample is increased.

MP 1211

MP 1211

PERMAPROST BENEATH THE BEAUFORT SEA, NEAR PRUDHOE BAY, ALASKA.
Selimann, P.V., et al, Offshore Technology Conference, 11th. Proceedings, Houston, Texas, 1979, p.1481-1493, 34 refs. Chamberlain, E.J.

33-3864

SUBSEA PERMAFROST, DRILL CORE ANALYSIS, PENETRATION TESTS, PERMAFROST DEPTH.

DBTH.

The occurrence and properties of subsea permafrost near Prudhoe Bay, Alaska, were investigated by drilling and probing. Nine holes were drilled and 27 sites were probed with a cone penetrometer. The deepest drill hole was 65.1m below the seabed, while a depth of 14.1 m was reached with the cone penetrometer. Begineering and chemical properties were determined from core samples and point penetration resistance data were obtained with the penetrometer. Thermal profiles were acquired at both the drill and probe sites.

MP 1212

COMPARATIVE TESTING SYSTEM OF THE APPLICABILITY FOR VARIOUS THERMAL SCANNING SYSTEMS FOR DETECTING HEAT LOSSES IN BUILDINGS.

Grot, R.A., et al, Infrared Information Exchange, 4th. Proceedings, St. Louis, Missouri, 1978, p.B71-B90, 18 refa

Munis, R.H., Marshall, S.J., Greatorex, A. 33-3735

BUILDINGS, HEAT LOSS, TEMPERATURE

MEASUREMENT, TESTS. A two-stage program for determining the applicability of various remote thermal scanning systems for detecting heat losses in buildings is described. The types of instruments tested are high resolution thermal imaging systems, low resolution thermal imaging systems, thermal line scanners and point radiometers. The first phase of this project consisted of inserting known building defects into a specially designed room at the USA Cold Regions Research and Engineering Laboratory and having a representative of the manufacturer of each type of equipment inspect the room at three temperature differences across the room envelone. The second obase of each type of equipment inspect the room at three temperature differences across the room envelope. The second phase of this project will consist of a field evaluation of these same instruments in approximately 10 cities, in cooperation with a weatherization program for low-income housing sponsored by the Community Services Administration and directed by the National Bureau of Standards. The goal of the second phase is to determine the cost effectiveness of various remote thermal scanning services.

DETECTING WET ROOF INSULATION WITH A HAND-HELD INFRARED CAMERA.

Korhonen, C., et al, Infrared Information Exchange, 4th. Proceedings, St. Louis, Missouri, 1978, p.A9-A15, 5 refs.

33-3736

INFRARED PHOTOGRAPHY, ROOFS, MOISTURE, DETECTION.

TURE, DETECTION.

Since 1975, CRREL has used hand-held infrared scanners for detecting wet insulation under built-up roof membranes. Thermocouples installed on roofs have shown that temperature differences between areas of wet and dry insulation may exist during both the day and night. The optimum time to detect these differences with an infrared camera is at night when solar interference is eliminated. Surveys have been conducted successfully in many locations from Alabams to Alaska during both warm and cold weather. Three-inch diameter core samples of the roof membrane and insulation have been obtained to verify infrared findings. This paper briefly overviews the technique used to survey roofs for moisture and then presents results of a controlled experiment at Pease. AFB, New Hampshire, to show the correlation between thermal images and temperature differences observed thermoelectrically in wer and dry portions of a roof. Measurements of the thermal resistance of the wet and dry areas complete the physical picture.

REMOTE DETECTION OF WATER UNDER ICE-COVERED LAKES ON THE NORTH SLOPE OF ALASKA.

Kovacs, A., Arctic, Dec. 1978, 31(4), p.448-458, 9

33-3773

REMOTE SENSING, LAKE WATER, LAKE ICE, RADAR ECHOES, ICE COVER THICKNESS, WATER SUPPLY.

RESULE From using an impulse radar sounding system on the North Slope of Alaska to detect the existence of water under take ice are presented. It was found that both lake ice thickness and depth of water under the ice could be determined when the radar antenna was either on the ice surface or sirborne in a helicopter. The findings also revealed that the impulse radar sounding system could detect where lake ice was bottom-fast and where water existed under the ice cover.

GEOBOTANICAL STUDIES ON THE TAKU GLACIER ANOMALY.

Heusser, C.J., et al. Geographical review, Apr. 1954, 44(2), p.224-239, AD-030 651, 21 refs. Same as SIP-10697. Also issued as Report No.7, Contract 10697. Also issued as Report No.7, Contract n9onr83001.

Schuster, R.L., Gilkey, A.K.

33-3760

GLACIER FLOW, VEGETATION PATTERNS, GEOBOTANICAL INTERPRETATION, UNITED STATES—ALASKA—TAKU GLACIER.

MP 1216 RIVER ICE.

Ashton, G.D., Annual review of fluid mechanics, Vol.10, edited by M. Van Dyke, J.V. Wehausen, and J.L. Lumley, Palo Alto, California, Annual Reviews, 1978, p.369-392, 85 refs. 33-3953

RIVER ICE, ICE MECHANICS, ICE PRESSURE, FLUID MECHANICS.

The emphasis is on the fluid mechanical aspects of river ice including the areas of formation, evolution, and breakup of ice covers, hydraulics associated with the presence of ice, thermal effects and interactions with ice, and forces due to ice. River ice processes may be summarized as a series of steady states that exist between short periods of intense activity and change.

MP 1217 DETERMINING SUBSEA PERMAFROST CHARACTERISTICS WITH A CONE PENE-TROMETER—PRUDHOE BAY, ALASKA.

Blouin, S.E., et al. Cold regions science and technology, June 1979, 1(1), p.3-16, 10 refs.
Chamberlain, E.J., Sellmann, P.V., Garfield, D.E.

33-4236

SUBSEA PERMAFROST, PENETRATION TESTS, PERMAFROST DISTRIBUTION, PENETROME-TERS, UNITED STATES—ALASKA—PRUDHOE

MP 1218

RELATIONSHIPS BETWEEN JANUARY TEM-PERATURES AND THE WINTER REGIME IN

Bilello, M.A., et al, Cold regions science and technology, June 1979, 1(1), p.17-27, 12 refs.

Appel, G.C. 33-4237

33-423/ WEATHER FORECASTING, FROST FORECAST-ING, SNOW ACCUMULATION, SEASONAL FREEZE THAW, METEOROLOGICAL DATA, METEOROLOGICAL CHARTS.

MP 1219 WATER FLOW THROUGH HETEROGENEOUS SNOW.

Colbeck, S.C., Cold regions science and technology, June 1979, 1(1), p.37-45, 19 refs.

MELTWATER, SNOW COVER STRUCTURE, WATER FLOW, SNOW STRATIGRAPHY, CAPILLARITY, SURFACE WATERS.

An earlier gravity flow theory (Colbeck 1971) treated snow as a homogeneous and uniform medium. The theory is expanded here to include the effects of ice layers and flow channels. Two examples are constructed and compared with observed runoff. In this particular situation, the results suggest that most of the water moves down flow channels.

MP 1220

FREEZING AND THAWING TESTS OF LIQUID DEICING CHEMICALS ON SELECTED PAVE-MENT MATERIALS.

Minsk, L.D., Cold regions science and technology, June 1979, 1(1), p.51-58, 8 refs. 33-4241

CONCRETE PAVEMENTS, ICE REMOVAL, AN-TIFREEZES, TESTS.

TIPRBECES, TESTS.

The extent of deterioration of portland cement concrete and several types of asphaltic concrete subjected to organic deicing chemicals was determined over 60 freezing-thawing cycles. Proprietary solutions containing ures, ethylene glycol, and formamide affected the surface of old sir-entrained concrete only slightly (rating of 1 on a scale of 0 to 5 of increasing degradation). Asphaltic concrete specimens were not significantly affected. Abrasion tests were made on air-entrained concrete specimens exposed to ethylene glycol solution during freezing and thawing; material loss was very low, nearly the same as with a distilled water control.

MP 1221
ELECTRICAL GROUND IMPEDANCE MEASUREMENTS IN THE UNITED STATES BETWEEN 200 AND 415 KHZ.
Arcone, S.A., et al, U.S. Federal Aviation Agency.
Research and development report, Dec. 1978, FAARD-78-103, 92p., ADA-068 088.

Delaney, A.J. 33-4413

RADIO WAVES, ELECTRICA', RESISTIVITY, MAPPING.

MAPPING.

The objectives of the work described in this report were to use and evaluate new radiowave methods of measuring earth resistivity in the LF and VLF bands and to develop estimated effective ground resistivity maps in this same band for the United States, including Alaska. Both airborne and ground methods were investigated by using the wavetilt and surface impedance techniques. It is concluded from the VLF study that over much of the central United States VLF airborne resistivity might well approximate LF ground resistivity. The ground methods discussion concerns the surface impedance method in the LF band. It is concluded from the LF studies that the present conductivity map is fairly accurate for BCB purposes but inapplicable to LF purposes.

MP 1222 CASE STUDY: FRESH WATER SUPPLY FOR POINT HOPE, ALASKA.

McFadden, T., et al. Conference on Applied Techniques for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol. 2, New York, American Society of Civil Engineers, 1979, p.1029-1040, 10 refs Collins, C.M.

WATER SUPPLY, PERMAPROST HYDROLOGY, SNOWMELT, ICE MELTING, LAKE WATER, UNITED STATES—ALASKA—POINT HOPE.

MP 1223

SNOW AND ICE ROADS IN THE ARCTIC. Johnson, P.R., Conference on Applied Techniques for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol.2, New York, American So-ciety of Civil Engineers, 1979, p.1063-1071, 6 refs. 33-4461

SNOW ROADS, ICE ROADS, AIRPORTS, COLD WEATHER CONSTRUCTION, ENVIRONMENTAL PROTECTION, ARCTIC VEGETATION, CONSTRUCTION MATERIALS.

MP 1224 REMOTE DETECTION OF A FRESHWATER POOL OFF THE SAGAVANIRETOK RIVER DELTA, ALASKA.

Kovacs, A., et al, Arctic, June 1979, 32(2), p.161-164,

Morey, R.M. 33-4511

RADAR ECHOES, GROUND ICE, GROUND WATER.

MP 1225 EFFECT OF FREEZING AND THAWING ON THE PERMEABILITY AND STRUCTURE OF

Chamberlain, E.J., et al, *Engineering geology*, 1979, Vol.13, p.73-92, For another version and abstract see 32-3469. 11 refs. Gow, A.J. 33-4548

53-43-6 PREEZE THAW CYCLES, SOIL WATER MIGRA-TION, PERMEABILITY, SOIL STRUCTURE, SOIL PHYSICS, SOIL TEXTURE, PARTICLE SIZE DISTRIBUTION, FINES.

MP 1226 EFFECT OF FREEZE-THAW CYCLES ON RESILIENT PROPERTIES OF FINE-GRAINED

Johnson, T.C., et al, Engineering geology, 1979, Vol.13, p.247-276, For another version and abstract see 32-3502. 20 refs.
Cole, D.M., Chamberlain, E.J. 33-4549
FROTEN

33-4349
FROZEN GROUND MECHANICS, FREEZE
THAW CYCLES, PAVEMENT BASES, BEARING
TESTS, SHEAR STRESS, SUBGRADE SOILS,
LOADS (FORCES), SOIL TEMPERATURE, MOD-

THERMAL AND RHEOLOGICAL COMPUTA-TIONS FOR ARTIFICIALLY FROZEN GROUND CONSTRUCTION. FROZEN

Sanger, F.J., et al, *Engineering geology*, 1979, Vol.13, p.311-337, 32 refs. For another version and abstract see 33-4283.

Sayles, F.H. 33-4550

33-4350 SOIL FREEZING, ARTIFICIAL FREEZING, FROZEN GROUND MECHANICS, FROZEN GROUND THERMODYNAMICS, CREEP PROPERTIES, RHEOLOGY, THERMAL PROPERTIES, FROST HEAVE, ANALYSIS (MATHEMATICS), CONSTRUCTION.

MAP 1228
LAND APPLICATION OF WASTEWATER: EFFECT ON SOIL AND PLANT POTASSIUM.
Palazzo, A.J., et al, Journal of environmental quality,
July-Sep. 1979, 8(3), p.309-312, 19 refs.
Jenkins, T.F.
33-4584
WASTE

WASTE TREATMENT, WASTE DISPOSAL, GRASSES, SOIL CHEMISTRY, IRRIGATION.

MULTI YEAR PRESSURE RIDGES IN THE CANADIAN BEAUFORT SEA.

Wright, B., et al, International Conference on Port and Ocean Engineering Under Arctic Conditions, 5th, Trondheim, Norway, Aug. 13-18, 1979. Proceed-ings, Vol.1, Trondheim, University, 1979, p.107-126,

Hnatiuk, J., Kovaca, A.

33.4600 SEA ICE, PRESSURE RIDGES, ICE STRUCTURE, MODELS.

MODELS.

The findings of a field study designed to generate fundamental data on multi-year pressure ridges in the near shore zone of the Canadian Beaufort Sea are presented. The study investigated the geometry of eleven floating multi-year ridges or ridge fragments and the sail height and keel depth of four additional multi-year ridge fragments. The cross-sections of multi-year ridges fragments. The cross-sections of multi-year ridges fragments. The cross-sections of multi-year ridges with total thicknesses varying between 9.6 and 41.8 m were examined, and the results suggest that they can be adequately represented by one ridge model with a constant sail to keel ratio and geometry. It is also shown that the ice comprising multi-year ridges is solid with the interblock voids existing at the time of their formation being completely filled with ice. The data obtained from this study are being used in the engineering design of exploration and production systems for the Beaufort Sea. In the shallow waters of this area, exploratory drilling from artificial islands has been carried out since 1973, and since 1976, the exploration effort has extended into the deeper waters of the Beaufort Sea, using drillships.

MP 1230 ICE PILE-UP AND RIDE-UP ON ARCTIC AND SUBARCTIC BEACHES.

Kovacs, A., et al, International Conference on Port and Ocean Engineering Under Arctic Conditions, 5th, Trondheim, Norway, Aug. 13-18, 1979. Proceed-ings, Vol.1, Trondheim, University, 1979, p.127-146, 22 refs.

Sodhi, D.S. 33-4610

SEA ICE, SHORES, PRESSURE RIDGES, ICE PUSH.

PUSH.

Information on ahore ice pile-up and ride-up in arctic and subarctic waters is presented.

Cross-sectional profiles of several ice pile-ups and ride-ups are presented from which models and theoretical analyses were made. The expressions derived give the force required to overcome gravitational potential and friction occurring during ice-piling and ride-up. It was estimated that the distributed force required during ice-piling or ride-up was of the order of 10 to 350 kPa (about 1.5 to 50 pa). Field observations revealed that shore ice pile-up or ride-up appears to occur within a period of less than 30 minutes at any time of year, but most often in the spring and fall. Pile-up seldom occurs more than 10 m inland from the sea, but ride-up frequently extends 50 m or more inland, regardless of ice thickness. While steeply aloging shores do not favor ice ride-up, sea ice has mounted the steep, 9-m-high bluff at Barrow, Alaska, destroying structures and taking lives.

MP 1231

TEMPERATURE EFFECT ON THE UNIAXIAL STRENGTH OF ICE.

Haynes, F.D., International Conference on Port and Ocean Engineering Under Arctic Conditions, 5th, Trondheim, Norway, Aug. 13-18, 1979. Proceedings, Vol.1, Trondheim, University, 1979, p.667-681, 17 refs 33-4632

ICE STRENGTH, COMPRESSIVE STRENGTH, TENSILE PROPERTIES.

TENSILE PROPERTIES.

The effect of temperature on the uniaxial strength of finegrained, polycrystalline ice was investigated. Dumbbellshaped specimens were loaded in uniaxial compression and
uniaxial tension. Two machine speech, 0.847 mm/s and
84.7 mm/s, were used for the tests, and the test temperatures
ranged from -0.1 to -54C. The uniaxial compressive strength
is very sensitive to temperature, generally increasing as the
temperature decreased from -0.1C to -54C, with the greatest
is very sensitive to temperature, but did continue to
increase with decreasing temperature. Tensile strength
also increased the most between -0.1C and -3C. An initial
tangent modulus and a 50% stress modulus were found
for each compression test. The initial tangent modulus
increased about two times as the temperature decreased
with decreasing temperature. A secant modulus was found
for the tensile tests and it tended to decrease with decreasing
temperature. The specific energy required to cause failure
was also found for the compression and tension tests.

BUCKLING ANALYSIS OF WEDGE-SHAPED PLOATING ICE SHEETS.

Sodhi, D.S., International Conference on Port and Ocean Engineering Under Arctic Conditions, 5th, Trondheim, Norway, Aug. 13-18, 1979. Proceed-ings, Vol.1, Trondheim, University, 1979, p.797-810, 7 refs.

33-4641

SEA ICE, FLOATING ICE, ICE LOADS, ICE PRESSURE.

A buckling analysis for semi-infinite wedge-shaped floating ice sheets is presented, considering a radial stress field for the in-plane stresses. The buckling load and buckling pressure are computed for varying ice sheet geometry and boundary conditions. The results of this analysis are close to those of earlier analyses for semi-infinite ice sheets and the same of the same o tanered bear

MP 1233

SNOW ACCUMULATION, DISTRIBUTION, MELT, AND RUNOFF.

Colbeck, S.C., et al, American Geophysical Union. Transactions, May 22, 1979, 60(21), p.465-468, 29 refs.

33-4547
SNOW ACCUMULATION, SNOW COVER DISTRIBUTION, SNOWMELT, RUNOFF, HEAT TRANSFER, SNOW SURVEYS, REMOTE SENS-

MP 1234

COMPACTION OF WET SNOW ON HIGH-

Colbeck, S.C., National Research Council. Transpor-tation Research Board. Special report, 1979, No.185, International Symposium on Snow Removal and Ice Control Research, 2nd, Hanover, N.H., May 15-19, 1978. Proceedings, p.14-17, 7 refs. 34-52

WET SNOW, SNOW COMPACTION, SNOW RE-MOVAL, SALINITY.

MOVAL, SALINITY.

The compressibility of wet snow decreases with decreasing liquid water content but increases with decreasing salinity. Also, the tendency for snow splashing on highways increases with decreasing salinity. These opposite effects are complicated by the fact that liquid water content and salinity are not necessarily independent. The amount of liquid present can be controlled somewhat by the road grade, and salinity is generally determined by how much salt is applied to the road surface. For different situations it may be desirable to regulate salt applications in order to achieve a maximum amount of splashing with a minimum of compaction of wet snow into ice. Here we provide a qualitative review of wet snow and suggest how an understanding of wet snow's behavior on a road surface might increase our ability to deal with snow removal problems.

MP 1235

MP 1235 NUMERICAL SIMULATION OF ATMOSPHER-IC ICE ACCRETION.

Ackley, S.F., et al, National Research Council. Transportation Research Board. Special report, 1979, No.185, International Symposium on Snow moval and Ice Control Research, 2nd, Hanover, N.H., May 15-19, 1978. Proceedings, p.44-52, 7 refs.

Templeton, M.K. 34-57

ICE ACCRETION, MATHEMATICAL MODELS, ENVIRONMENT SIMULATION, DROPS (LIQUIDS), PARTICLE SIZE DISTRIBUTION, TIME FACTOR.

Time-dependence enters into calculations of ice accretion on objects primarily through terms dependent on the initial conditions and size and geometry of the object. A numerical technique to include the time-dependence is described here as well as simulation of complex situations where the conditions as well as azmusation or complex situations where the conditions vary, for example, along a helicopter rotor blade. Some results of varying droplet sizes, velocity, and droplet distributions are presented. These indicate the general dependence of ice accretion on these parameters as well as illustrate the utility of numerical techniques in seeing how these effects can influence the rates of ice accretion for particular initial

MP 1236 LABORATORY EXPERIMENTS ON ICING OF

ROTATING BLADES.
Ackley, S.F., et al, National Research Council.
Transportation Research Board. Special report, 1979, No.185, International Symposium on Snow Removal and Ice Control Research, 2nd, Hanover, N. I., May 15-19, 1978. Proceedings, p.85-92, 7 refs. Lemieux, G., Itagaki, K., O'Keefe, J.

34-65 LABORATORY TECHNIQUES, ICE ACCRETION, HELICOPTERS, ICE COVER THICKNESS, TEMPERATURE EFFECTS.

Experiments have been conducted to provide a basis for a computer model that simulates atmospheric ice accretion on a rotating blade. A comparison of the computer model simulation and experimental results reveals that general agree-

ment exists within the temperature range 0 C to -25 C and the velocity range 0 to 60 m/s. Beyond 60 m/s the computer simulation over-predicts the thickness of the ice accretion at the leading edge. Below -25 C the simulation and experimental results disagree in that the simulation significantly overpredicts the thickness of the accretion at the

MP 1237

MAY 1437
SYSTEMS STUDY OF SNOW REMOVAL
Minsk, L.D., National Research Council. Transportation Research Board. Special report, 1979, No.185,
International Symposium on Snow Removal and Ice
Control Research, 2nd, Hanover, N.H., May 15-19,
1978. Proceedings, p.220-225, 4 refs.
34.84

SNOW REMOVAL, SYSTEMS ANALYSIS.

The framework for a systems analysis of snow removal and ice control on roads is presented. Definition of the operating conditions, the principal ones of which are climate and traffic, as well as the system itself, the road net, is required. Equipment factors involved in performing the basic functions of clearing, spreading, loading, and hauling are analyzed.

MP 1238 COMPUTER SIMULATION OF URBAN SNOW REMOVAL

Tucker, W.B., et al, National Research Council.
Transportation Research Board. Special report, 1979, No.185, International Symposium on Snow moval and Ice Control Research, 2nd, Hanover, N.H., May 15-19, 1978. Proceedings, p.293-302, 11 refs. an, G.M. 34-95

SNOW REMOVAL, COMPUTERIZED SIMULA-TION, ENVIRONMENT SIMULATION.

TION, ENVIRONMENT SIMULATION.

A general computer model to simulate urban snow removal has been developed. One part of the package includes aeveral programs which sasist in the routing of snow removal vehicles using computer graphics. The primary element, however, is a program which, once specific vehicle routes are input, allows the simulation of any particular mow removal accessio. Parameters that can be varied include both truck and snowstorm characteristics. This simulation program is tested using truck routes and storm data from Newington, Connecticut. Results indicate that the simulation predicts rolowing times quite reasonably. connecticut. Results indicate plowing times quite reasonably

MP 1239 ULTRASONIC VELOCITY INVESTIGATIONS OF CRYSTAL ANISOTROPY IN DEEP ICE CORES FROM ANTARCTICA.

Kohnen, H., et al, Journal of geophysical research, Aug. 20, 1979, 84(C8), p.4865-4874, 22 refs. Gow, A.J.

34-410

ICE CORES, ICE CRYSTAL STRUCTURE, ICE ACOUSTICS, ICE SHEETS, ANISOTROPY, WAVE PROPAGATION, ULTRASONIC TESTS, GLACIER FLOW, ICE CRYSTAL SIZE, SHEAR PROPERTIES, ANTARCTICA—BYRD STATION, ANTARCTICA—LITTLE AMERICA STATION. For the same paper from another source and abstract see 33-4204 or F-21944.

MP 1240 SEA ICE RIDGING OVER THE ALASKAN CON-TINENTAL SHELF.

Tucker, W.B., et al, Journal of geophysical research, Aug. 20, 1979, 84(C8), p.4885-4897, 24 refs. For the same paper from another source and abstract see 33-4223

Weeks, W.F., Frank, M.

34-411 SEA ICE DISTRIBUTION, PRESSURE RIDGES, ICE DEPORMATION, SURFACE ROUGHNESS, PROFILES, LASERS, MATHEMATICAL MODELS, STATISTICAL ANALYSIS, REMOTE SENS-ING. FORECASTING

MP 1241

SOME RESULTS FROM A LINEAR-VISCOUS MODEL OF THE ARCTIC ICE COVER. Hibler, W.D., III, et al, Journal of glaciology, 1979, 22(87), p.293-304, 12 refs. Tucker, W.B. 34-544

34-544 ICE PHYSICS, DRIFT STATIONS, ICE MODELS, SEA ICE, VISCOSITY, OCEAN CURRENTS, STRESSES.

MP 1242

STANDING CROP OF ALGAE IN THE SEA ICE OF THE WEDDELL SEA REGION.

Ackley, S.F., et al, Deep-ses research, Mar. 1979, 26(3A), p.269-281, 19 refs.
Buck, K.R., Taguchi, S. 33-4674

SEA ICE, ALGAE, CRYOBIOLOGY, WEDDELL SEA.

Physical and biological measurements were made of sea ice cores taken from 69 to 78 S in the Weddell Sea. Fluores-

cence measurements indicated an algal community that was strongly associated with salinity maxima within the ice. Maximum concentrations of chlorophyll a ranged from 0.3 in the 4.54 mg cu m. Comparisons with standing crops in the water column indicate that the standing crop within the ice can represent a minor but significant fraction of the total standing crop for the region. The sea ice algal community is apparently distinct from others that have been described for land-fast ice in McMurdo Sound, sea ice in the Arctic, and pack ice off East Antarctica. The highest concentrations of biological material are found in the bottom or top samples from those regions, whereas the Weddell Sea maxima are concentrated at intermediate depths (0.65 to 2.15m) within the ice. A qualitative model indicating the relationship between thermally induced brine migration and subsequent algal growth is presented. (Auth. mod.)

FORMATION OF ICE RIPPLES ON THE UN-DERSIDE OF RIVER ICE COVERS.

Ashton, G.D., Iowa City, University of Iowa, 1971, 157p., University Microfilms order No.71-30,392, Ph.D. thesis. For abstract see Dissertation abstracts international, Sec. B, Nov. 1971, p.2762.

RIVER ICE, ICE BOTTOM SURFACE, ICE WATER INTERPACE, TURBULENT FLOW, HEAT TRANSFER, THERMAL CONDUCTIVITY, WATER FLOW, VELOCITY.

RESEARCH ACTIVITIES OF U.S. ARMY COLD REGIONS RESEARCH AND ENGINEERING LABORATORY.

Buzzeli, T.D., Alaska. University. Institute of Water Resources. Report, Mar. 1975, IWR-62, Envi-ronmental Standards for Northern Regions: a symposium, June 1974, Anchorage, Alaska. p.9-12. 34-631 LABORATORIES, RESEARCH PROJECTS.

20-YR CYCLE IN GREENLAND ICE CORE RE-

CORDS.

Hibler, W.D., III, et al, *Nature*, Aug. 9, 1979, 280(5722), p.481-483, 26 refs.

Johnsen, S.J.

34-737

ICE CORES, DRILL CORE ANALYSIS, ISOTOPE ANALYSIS, PERIODIC VARIATIONS.

Oxygen isotope analysis of Greenland ice cores is made and the methods of analysis are described. Cyclic variations of about 20 yr seem to coincide with climatic oscillations and the Sun's motion about the center of mass of the Solar System. These periodic variations are compared with the oxygen isotope record in the ice cores.

PHENOMENOLOGICAL DESCRIPTION OF THE ACOUSTIC EMISSION RESPONSE IN SEVERAL POLYCRYSTALLINE MATERIALS.

St. Lawrence, W.F., Journal of testing and evaluation, July 1979, 7(4), p.223-228, 11 refs.

SNOW DEFORMATION, SNOW COVER STRUC-TURE, SNOW ACOUSTICS, ACOUSTIC MEASUREMENT, MODELS.

UREMEN I, MODELS.

The pattern of acoustic emission response in snow subjected to constant deformation rates is examined. The structural character of snow is discussed, and an equation that describes the pattern of the acoustic emission response is derived. Comparison between the predicted acoustic response and experimental data is made and the agreement is shown to be excellent. The acoustic emission response for 7075-T6 aluminum and iron-3% silicon subjected to constant rates of deformation is also considered. The acoustic emission equation derived for anow represents the response in these materials. It is suggested that the internal fracture concept used to develop the model for snow may also apply to used to develop the model for snow may also apply to other densely packed polycrystalline materials. to develop

MP 1247 DYNAMIC THERMODYNAMIC SEA ICE MOD-

Hibler, W.D., III, Journal of physical oceanography, July 1979, 9(4), p.815-846, 51 refs.

SEA ICE, THERMODYNAMICS, HEAT TRANS-FER, ICE COVER THICKNESS, MATHEMATI-CAL MODELS.

A numerical model for the simulation of sea ice circulation and thickness over a seasonal cycle is presented. This model is used to investigate the effects of ice dynamics on arctic ice thickness and sir-sea heat flux characteristics on arctic ice thickness and air-sea heat flux characteristics by carrying out several numerical simulations over the entire Arctic Ocean region. The essential idea in the model is to couple the dynamics to the ice thickness characteristics by allowing the ice interaction to become stronger as the ice becomes thicker and/or contains a lower areal percentage of thin ice. The dynamics, in turn, causes high oceanic heat losses in regions of ice divergence and reduced heat losses in regions of convergence. To model these effects consistently, the ice is considered to interact in a plastic manner with the plastic strength chosen to depend on the ice thickness and concentration. The thickness and concentration, in turn, evolve scoording to continuity equations which include changes in ice mass and percent of open water due to advection, ice deformation and thermodynamic

MP 1248 STEADY IN-PLANE DEFORMATION OF NON-COAXIAL PLASTIC SOIL.

Takagi, S., International journal of engineering acience, 1979, Vol.17, p.1049-1072, 27 refs. 34-860

SOIL CREEP, PLASTIC PROPERTIES, THEORIES, BOUNDARY VALUE PROBLEMS, ANALYSIS (MATHEMATICS).

YSIS (MATHEMATICS).

Presented in this paper is the theory of the steady inplane deformation, obeying the Coulomb yield criterion, of
plastic soils whose strain rate and stress principal directions
are noncoaxial. The constitutive equations including an
unknown noncoaxial angle are derived by use of the geometry
of the Mohr circle and the theory of characteristic lines.
A boundary value problem is solved by assigning to the
non coaxial angle a set of such values that enable us to
accommodate the presupposed type of flow satisfying the
given boundary conditions in a given domain. The plastic
material regulated by the Coulomb yield criterion in inplane deformation is, therefore, a singular material whose
constitutive equations are not constant with material but
are variable with flow conditions.

MP 1249 SAFE ICE LOADS COMPUTED WITH A POCK-ET CALCULATOR.

Nevel, D.E., National Research Council, Canada. Associate Committee on Geotechnical Research. Technical memorandum, May 1979, No.123, p.205-223, 3 refs. 34-932

ICE STRENGTH, LOADS (FORCES), COMPUT-ER APPLICATIONS.

This report provides a program for calculating the deflection and stresses of a floating ice sheet using a pocket calculator. The program user must select appropriate values for the ice mechanical properties in order to compute reliable deflection and stresses. Engineering judgement must be used to select the allowable ice strength and when dealing with recuirds impations. non-ideal situations

PROBLEMS OF OFFSHORE OIL DRILLING IN THE BEAUFORT SEA.

Weller, G., et al, Northern engineer, Winter 1978, 10(4), p.4-11, 5 refs. Weeks, W.F.

34-942

ICE STRUCTURE, OFFSHORE DRILLING, FLOATING ICE, GROUNDED CE, SEA ICE DISTRIBUTION, SUBSEA PERMAPROST.

MP 1251 COLD REGIONS RESEARCH AND ENGINEER-ING LABORATORY. Freitag, D.R., Northern engineer, Fall 1977, 10(3),

4-869 LABORATORIES, U.S. ARMY CRREL.

RECENT ICE OBSERVATIONS IN THE ALAS-KAN BEAUPORT SEA FEDERAL-STATE LEASE AREA.

Kovacs, A., Northern engineer, Fall 1978, 10(3), p.7-

34-870 SEA ICE, FAST ICE, RADAR ECHOES, PRES-SURE RIDGES, SEISMIC SURVEYS.

DESIGN AND CONSTRUCTION OF TEMPORARY AIRFIELDS IN THE NATIONAL PETROLEUM RESERVE—ALASKA.

Crory, F.E., Northern engineer, Fall 1978, 10(3), p.13-

AIRCRAFT LANDING AREAS, SUBGRADE PREPARATION, INSULATION.

MP 1254 HUMAN-INDUCED THERMOKARST AT OLD DRILL SITES IN NORTHERN ALASKA Lawson, D.E., et al, Northern engineer, Fall 1978, 10(3), p.16-23, 16 refs.

Brown, J.

TUNDRA, SOIL EROSION, THERMOKARST, HUMAN FACTORS, ACTIVE LAYER, SUBSI-DENCE.

OVERCONSOLIDATED SEDIMENTS IN THE

BEAUFORT SEA.
Chamberlain, E.J., Northern engineer, Fall 1978, 10(3), p.24-29, 15 refs. 34-873

BOTTOM SEDIMENT, THAW CONSOLIDATION, CLAY SOILS, FREEZE THAW CYCLES. MP 1256

WASTE HEAT RECOVERY FOR HEATING PUR-POSES

Phetteplace, G., Northern engineer, Fall 1978, 10(3). p.30-33. 34-874

HEAT RECOVERY, HEATING, PUMPS.

MP 1257 MIZER 84 MESOSCALE SEA ICE DYNAMICS: POST OPERATIONS REPORT. Hibler, W.D., III, et al, U.S. Army Cold Regions Re-

search and Engineering Laboratory. Special report, Oct. 1984, SR 84-29, MIZEX: a program for mesoscel. 1904, 88 e4-29, MIZEA: a program for mesos-cale air-ice-ocean interaction experiments in Arctic marginal ice zones. 5: MIZEX 84 summer experi-ment PI preliminary reports. Edited by O.M. Johan-nessen and D.A. Horn, p.66-69, ADA-148 986. Leppäranta, M., Decato, S., Alverson, K. 40-4695

ICE MECHANICS, SEA ICE, ICE CONDITIONS, DRIFT STATIONS, ICE FDGE, MEASURING INSTRUMENTS.

MP 1258

ANISOTROPIC PROPERTIES OF SEA ICE IN THE 50- TO 150-MHZ RANGE.

Kovaca, A., et al. Journal of geophysical research, Sep. 20, 1979, 84(C9), p.5749-5759, 4 refs. Morey, R.M. 34-963

SEA ICE, RADAR ECHOES, ICE CRYSTAL STRUCTURE, OCEAN CURRENTS, DIELECTRIC PROPERTIES, ANISOTROPY.

TRIC PROPERTIES, ANISOTROPY.

Results of impulse radar studies of sea ice near Prudhoe Bay, Alaska, show that where there is a preferred current direction under the ice cover, the crystal structure of the ice becomes highly ordered. This includes a crystal structure with a preferred borizontal c axis that is oriented parallel with the local current. The radar studies show that this structure behaves as an anisotropic dielectric. The result is that when electromagnetic energy is radiated from a dipole antenna in which the E field is oriented perpendicular to the c axis aximuth, no bottom reflection is detected. It was also found that the frequency dispersion of anisotropic sea ice varies in the borizontal plane. This is demonstrated by the center frequency of the reflected signal spectrum, which is maximum in the preferred c axis direction and minimum perpendicular to it. In addition, it was found that the frequency dispersion is related to the average bulk brine volume of the ice but that the bulk dielectric constant of the ice, as determined from impulse travel time, shows little correlation with the coefficient of anisotropy.

MP 1259

MP 1259 ANALYSIS OF COUPLED HEAT AND MOIS-ANALYSIS OF COUPLED HEAT AND MOISTURE FLOW IN AN UNSATURATED SOIL.
O'Neill, K., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Jan. 1979, SR 79-36, Meeting on Modeling of Snow Cover Runoff, 26-28 September 1978, Hanover, New Hampshire. Proceedings, edited by S.C. Colbeck and M. Ray, p.304-309, ADA-167 767, 25 refs.
34-1027

SOIL WATER MIGRATION, HEAT TRANSFER. This paper presents a set of partial differential equations that describes the concurrent one-dimensional flow of liquid and heat in unfrozen unasturated soils. A Galerkin finite element method based on hermite polynomials was used to solve the equations numerically. To verify both the theory and the solution method, laboratory measurements were made on a horizontal soil column. The results furnished essential transport coefficient values, as well as data records over space and time for infiltrations of cold water that produced steep, interacting temperature and moisture content gradients. Comparison of measured and predicted values showed very good agreement in both the moisture and temperature domains. Contrary to the usual assumption in soil studies, liquid convection played a large role in the heat transfer. A simple geometric mean formula represented the soil thermal conductivity quite adequately. SOIL WATER MIGRATION, HEAT TRANSFER.

MP 1260 SURFACE-BASED SCATTEROMETER RE-SULTS OF ARCTIC SEA ICE.

Onstott, R.G., et al, IEEE transactions of geoscience electronics, July 1979, GE-17(3), p.78-85, 16 refs. Moore, R.K., Weeks, W.F. 34-1167

SEA ICE, RADAR ECHOES, BACKSCATTER-ING, PRESSURE RIDGES, ICE COVER THICK-

dar backscatter measurements were made of shorefast sea near Point Barrow, AK, in May 1977, with a surface-Radar be

based FM-CW scatterometer that swept from 1-2 GHz and from 8.5-17.5 GHz. The 1-2 GHz measurements showed that thick first-year and multiyear ice cannot be distinguished at 10-70 deg incidence angles but that undeformed sea ice can be discriminated from pressure ridges and lake ice. Results also indicate that frequencies between 8-18 GHz have the shility to discriminate between thick first-year, multiyear, and lake ice. Cross polarization was found to be a better discriminator than like polarization. In addition, at these latter frequencies the differential scattering was found to have an approximately linearly increasing frequency response. cy respon

MP 1261

FOCUS ON U.S. SNOW RESEARCH. Colbeck, S.C., Glaciological data, Aug. 1979, GD-6, p.41-52, 34 refs. 34-1411

SNOW SURVEYS, RESEARCH PROJECTS, IM-PACT, AGRICULTURE, WATER RESERVES.

MP 1262

SNOW AND THE ORGANIZATION OF SNOW RESEARCH IN THE UNITED STATES.

Colbeck, S.C., Glaciological data, Aug. 1979, GD-6, p.55-58, 1 ref.

SNOW SURVEYS, RESEARCH PROJECTS.

MP 1263

VISUAL OBSERVATIONS OF FLOATING ICE FROM SKYLAB.

Campbell, W.J., et al, U.S. National Aeronautics and Space Administration. Special publication, 1977, NASA-SP-380, Skylab explores the earth, prepared by NASA Lyndon B. Johnson Space Center, p.353-379, N77-28548, 2 refa.

Ramseier, R.O., Weeks, W.F., Wayneberg, J.A.

SPACEBORNE PHOTOGRAPHY, LAKE ICE, SEA ICE, RIVER ICE.

MP 1264

ANALYSIS OF FLEXIBLE PAVEMENT RESILI-ENT SURFACE DEFORMATIONS USING THE CHEVRON LAYERED ELASTIC ANALYSIS COMPUTER PROGRAM.

Simul, IN., et al, 1975, 13 leaves, Presented at the Symposium on Nondestructive Test and Evaluation of Airport Pavement, U.S. Army Waterways Experiment Station, ¿Vicksburg, Mississippi, November 18-20, 1975. 9 refs. Smith, N., et al, 1975, 13 leaves, Presented at the

Groves, J.A.

34-1501 PAVEMENTS, ELASTIC PROPERTIES, COM-PUTER APPLICATIONS.

MP 1265 NONCORROSIVE METHODS OF ICE CON-

TROL

Minsk, L.D., Public works and public utilities: report from a workshop considering problems identified by the Intergovernmental Science, Engineering, and Technology Advisory Panel, September 5-7, 1979, College Park, Maryland, Washington, D.C., American Association for the Advancement of Science, 1979, p.133-162, 33 refs. 34-1586

ROADS, ICE CONTROL, CHEMICAL ICE PRE-VENTION, ENVIRONMENTAL IMPACT, SALT-ING.

MP 1266

GEOPHYSICS IN THE STUDY OF PERMA-

FROST.
Scott, W.J., et al, international Conference on Permafrost, 3rd, Edmonton, Alberta, July 10-13, 1978. Proceedings, Vol.2, Ottawa, National Research Council of Canada, 1979, p.93-115, Refs. p.110-115.
Sellmann, P.V., Hunter, J.A.

34-1682

PERMAFROST PHYSICS, GEOPHYSICAL SUR-VEYS, SEISMIC SURVEYS, SOIL TEMPERA-TURE, ELECTRICAL RESISTIVITY, ACTIVE LAYER, ELECTROMAGNETIC PROSPECTING.

MP 1267 GRAIN CLUSTERS IN WET SNOW.

Colbeck, S.C., Journal of colloid and interface science, Dec. 1979, 72(3), p.371-384, 19 refs. 34-1698

WET SNOW, SNOW CRYSTAL STRUCTURE, GRAIN SIZE, BOUNDARY VALUE PROBLEMS, SNOW PHYSICS.

The grain boundaries in snow are generally unstable when the pore space is filled with liquid water (i.e., liquid-saturated snow). Thus, when unstressed snow is saturated with the melt, the ice particles in snow are cohesionless spheres. This leads to very low arengths and to rapid grain growth due to heat flow among particles of different sizes. The grain boundaries in highly unsaturated snow (up to about 7% liquid by volume) with small applied loads are stable,

and the grains must be arranged in clusters to achieve local force equilibrium. Two grains bond together with geometrical constraints on the radii of the phase boundaries. Three grains join at a liquid vein whose size is determined by grain size and capillary pressure (i.e., liquid "tension"). Slow grain growth occurs by sublimation, vapor diffusion, and condensation, and intergrain strength is relatively high. Once grain clusters are formed, equilibrium imposes constraints on the curvature of the phase boundaries which limit change in the carellary pressure. in the capillary pressure.

MP 1268

FEASIBILITY STUDY OF LAND TREATMENT OF WASTEWATER AT A SUBARCTIC ALASKAN LOCATION.

Scienten, R.S., et al, Cornell Agricultural Waste Management Conference, 8th, Rochester, N.Y., 1976. Proceedings. Land as a waste management alternative, edited by R.C. Loehr, Ann Arbor, Mich., Ann Arbor Science, 1977, p.533-547, For another version see 31-1949. 10 refs.

Uiga, A. 34-1749

WASTE TREATMENT, WATER POLLUTION, LAND RECLAMATION, SUBPOLAR REGIONS, SUBARCTIC LANDSCAPES, TESTS, UNITED STATES-ALASKA.

MP 1269

APPLICATION OF RECENT RESULTS IN FUNCTIONAL ANALYSIS TO THE PROBLEM WATER TABLES.

Nakano, Y., Advances in water resources, Dec. 1979, Vol.2, p.185-190, 7 refs. 34-1845

WATER TABLE, BOUNDARY VALUE PROB-LEMS, ANALYSIS (MATHEMATICS).

The traditional viewpoint in hydrology and soil physics pur-ports that water tables appearing in porous media described by Darcy's law and the extended Darcy's law are not singular surfaces. Several particular solutions in which singularities occur are presented as counter-examples to the traditional viewpoint and as evidence supporting the new theory that water tables a generally singular surfaces.

MP 1270

INCREASED MERCURY CONTAMINATION OF DISTILLED AND NATURAL WATER SAMPLES CAUSED BY OXIDIZING PRESERVA-

Cragin, J.H., Analytics chimics acts, 1979, Vol.110, p.313-319, 18 refs. 34-2004

WATER CHEMISTRY, GASES, VAPOR TRANS-FER, POLLUTION, LABORATORIES.

FER, POLLUTION, LABORATORIES.

The passage of mercury vapor from ambient air through the walls of conventional polyethylene (CPB), linear polyethylene (LPE), and Teflon (FEP) containers can seriously contaminate solutions of distilled and natural water stored in these containers. The rate of mercury contamination is dramatically increased when the sample solution contains oxidizing agents such as nitric acid or potassium permanganate, which are commonly used as preservatives to prevent loss of mercury (II) ion. The rate of contamination also depends on container material and decreases in the order CPE> LPE> FEP> glass. Preezing the samples in plastic containers is an effective way to prevent mercury contamination. When freezing is not practical, storage in glass containers minimizes sample contamination from ambient mercury vapor.

MP 1271

MP 1271

CORRELATION AND QUANTIFICATION OF AIRBORNE SPECTROMETER DATA TO TURBIDITY MEASUREMENTS AT LAKE POWELL, UTAH.

Метту, С. J., International Symposium on Remote Sensing of Environment, 13th, Ann Arbor, Michigan, April 23-27, 1979. Proceedings, Environmental Research Institute of Michigan, 1979, p.1309-1316, 7 refs.

34-2043 LAKE WATER, TURBIDITY, SUSPENDED SEDI-MENTS, LIGHT TRANSMISSION, AERIAL SUR-VEYS, SPECTROSCOPY.

VEYS, SPECTROSCOPY.

A water sampling program was accomplished at Lake Powell, Utah, during June 1975 for correlation to multispectral data obtained with a 500-channel airborne spectroradiometer. Field measurements were taken of percentage of light transmittance, surface temperature, pH and Seechi disk depth. Percentage of light transmittance was also measured in the laboratory for the water samples. Analyses of electron micrographs and suspended sediment concentration data for four water samples located at Hite Bridge, Mile 150 and Bullfrog Bay indicated differences in the composition and concentration of the particulate matter. Airborne spectrors/diometer multispectral data were analyzed for the four sampling locations. The results showed that: (a) as the percentage of light transmittance of the water samples decreased, the reflected radiance increased; and (b) as the suspended sediment concentration (mg/1) increased, the reflected radiance increased in the 1-80 mg/1 range. In conclusion, valuable qualitative information was obtained on surface turbidity for the Lake Powell water spectra. Also, the reflected radiance measured at a wavelength of 0.58

micron was directly correlated to the suspended acdiment

MP 1272

ON THE ORIGIN OF STRATIFIED DEBRIS IN ICE CORES FROM THE BOTTOM OF THE ANTARCTIC ICE SHEET.

Gow, A.J., et al. Journal of glaciology, 1979, 23(89), p.185-192, In English with French and German summaries. 11 refs.

Epstein, S., Sheehy, W.

34-2231

ICE CORES, DRILL CORE ANALYSIS, SEDI-MENTATION, STRATIFICATION, FREEZE THAW CYCLES.

THAW CYCLES.

Cores from the bottom 4.83 m of the antarctic ice sheet at Byrd Station contain abundant stratified debris ranging from silt-sized particles to cobbles. The nature and disposition of the debris, together with measurements of the physical properties of the inclosing ice, indicate that this zone of diri-taden ice originated by "freezing-in" at the base of the ice sheet. The transition from air-rich glacial ice to ice practically devoid of air coincided precisely with the first appearance of debris in the ice at 4.83 m above the bed. Stable-isotope studies made in conjunction with gas-content measurements also confirm the idea of incorporation of basal ice may well constitute the most diagnostic test for discriminating between debris incorporated in a meltitude of the company of the confirmation of basal between debris incorporated in a meltitude of the company of the confirmation of the company of the confirmation of the company of the confirmation of the company of the company of the confirmation of the company of the company of the confirmation of the company of the comp tion of basal ice may well constitute the most diagnostic test for discriminating between debris incorporated in a meli-refreeze process and debris entrapped by purely mechanical means, e.g. shearing. We conclude from our observations on bottom cores from Byrd Station that "freezing-in" of basal debris is the major mechanism by which sediment is incorporated into polar ice sheets. (Auth.) MP 1273

SUBARCTIC WATERSHED RESEARCH IN THE SOVIET UNION.

Slaughter, C.W., et al, Arctic bulletin, 1978, 2(13), p.305-313, For another version of this report see 32-1318 (CRREL SR 77-15). 6 refs. Bilello, M.A.

WATER BALANCE, STATIONS, RESEARCH PROJECTS, INTERNATIONAL COOPERATION, USSR-MAGADAN.

MP 1274 DRAINAGE NETWORK ANALYSIS OF A SU-BARCTIC WATERSHED.

BARCITC WATERSHED.

Bredthauer, S.R., et al, Alaska. University. Sea Grant Program. Report, Aug. 1979, 79-6, Alaska Science Conference, 29th, Fairbanks, Aug. 15-17, 1979. Proceedings (Alaska fisheries: 200 years and 200 miles of change), edited by B.R. Melteff, p.349-359, 8 refs. Hoch D.

WATERSHEDS, DRAINAGE, STREAM FLOW.

WATERSHEDS, DRAINAGE, STREAM FLOW. A drainage network map of the Caribou-Poker Creek Research Watershed, near Fairbanks, Alaska, has been used to conduct a Strahler stream order analysis and an analysis of length distributions of source and tributary-source links in a subarctic watershed. The basins have very low drainage densities, ranging from 1.35 km/sq km to 5.34 km/sq km. Bifurcation ratios were higher than those found in watersheds in the continental U.S. Statistical analysis indicates that source and tributary-source links in a subarctic watershed belong to different length populations, the same as found in other regions of the world. Additional analysis indicates that exterior links originating on permafrost slopes tend to be shorter than those originating on non-permafrost (well-drained) slopes.

MP 1275

HIGH-FORCE TOWING.

Mellor, M., Cold regions science and technology, Feb. 1980, 1(3/4), p.231-240, 5 refs.

ICEBERG TOWING, LOADS (FORCES).

ICEBERG TOWING, LOADS (FORCES). Required force levels for iceberg towing at 1 knot could be at least 50 tons for protection of structures and drillships in northern waters, and around 1000 tons for iceberg exports from the Antarctic. Corresponding values of effective ("towope") power are only 307 hp and 6140 hp, respectively. A conventional-hull supertug capable of 1000 tons thrust would probably have T/P = 10 10 10/hp, p=200,000 hp, and a propulsive efficiency of about 3%. The most practical expedient for sustractic towing seems to be use of multiple conventional tugs, with fewer tugs or higher speeds as the iceberg reduces its size and streamlines itself. The practical difficulty of towing antarctic icebergs may have been underestimated, and it might be worth reconsidering preliminary shaping of the iceberg to reduce the drag. (Auth.)

COMPARISON OF THE PEBBLE ORIENTA-TION IN ICE AND DEPOSITS OF THE MATA-NUSKA GLACIER, ALASKA.

Lawson, D.E., Journal of geology, Nov. 1979, 87(6), p.629-645, 21 refs. 34-2502

GLACIAL DEPOSITS, ICE STRUCTURE, SEDI-MENT TRANSPORT.

Depositional processes and their sediment source determine the orientation of pebbles in the deposits of the Matanuska

Chacier and the relationship of this orientation to the direction of ice flow. Pebble fabrics in ice-derived deposits differ from those in resedimented deposits: fabric in deposits from sediment flow, ablation of exposed basal zone ice, and the slumping and spalling of ice-cored slopes does not correspond to the ice flow direction, but is developed by these depositional processes. Pebbles in basal ice and melt-out till show a unimodal distribution of orientations, with individual observations only slightly discrepted about the mean axis. Pebble a mimodal distribution of orientations, with individual observations only slightly dispersed about the mean axis. Pebble fabrics in other deposits are polymodal, with a significantly larger amount of dispersion about the mean axis. The regional pattern of mean axes of basal zone ice and meltiout till pebble fabrics approximates the local and regional trends of ice flow, but pebble imbrication in ice and sediment does not necessarily indicate the direction from which the glacker flowed. A small number of measurements of pebble orientations at many sites and the analysis of these data by the eigenvalue method appear to be suitable techniques for examining the pebble fabric of glacial deposits, but additional sedimentological data are needed to define the origins of these deposits.

MP 1277

CRYSTAL ALIGNMENTS IN THE FAST ICE OF ARCTIC ALASKA.

Weeks, W.F., et al, Journal of geophysical research, Feb. 20, 1980, 85(C2), p.1137-1146, For this paper in another form see 34-1379 (CR 79-22, ADA-077 188). 8 refs.

34-2671

SEA ICE, ICE PHYSICS, ICE CRYSTAL STRUC-TURE, OCEAN CURRENTS.

TURE, OCEAN CURRENTS.
Field observations at 60 sites located in the fast or nearfast ice along a 1200-km stretch of the north coast of Alaska between the Bering Strait and Barter Island have shown that 95% of the ice samples exhibit striking c axis alignments within the horizontal plane. In all cases the degree of preferred orientation increased with depth in the ice. Representative standard devisitions around a mean direction in the horizontal plane are commonly less than 10 deg for samples collected near the bottom of the ice. The general patterns of the alignments support the correlation between the preferred c axis direction and the current direction at the ice/water interface suggested by Weeks and Gow (1978). A comparison between c axis alignments and instantanceous current measurements made at 42 locations shows that the most frequent current direction coincides with mean c axis direction. The c axis alignments are believed to be the result of geometric selection, with the most favored orientation being that in which the current flows normal to the (0001) plates of ice that comprise the dendritic sea ice/seawater interface.

MP 1278 TRAVELING WAVE SOLUTIONS OF SATURAT-ED-UNSATURATED FLOW THROUGH POR-

OUS MEDIA.
Nakano, Y. Water resources research, Feb. 16, 1980, 16(1), p.117-122, 9 refs.
34-2672

WAVE PROPAGATION, WATER FLOW.

Traveling wave solutions to the problem of saturated-unsaturated flow of water through a uniform porous medium are derived, and the regularity properties of the solutions are studied. It is found that a singularity occurs in the higher-order derivatives of flux with respect to the space coordinate in the solutions at water tables and that the water tables can be generally interpreted as propagating acceleration waves of the *n*th order, where *n* is a positive integer.

PILOT SCALE STUDY OF OVERLAND FLOW LAND TREATMENT IN COLD CLIMATES. Jenkins, T.F., et al, *Progress in water technology*, 1979, 11(4/5), p.207-214, 11 refs.

Martel, C.J. 34-2673

WASTE TREATMENT, WATER CHEMISTRY, IRRIGATION, COLD WEATHER TESTS.

IRRIGATION, COLD WEATHER TESTS.

Primary and secondary wastewaters were applied to separate sections of an overland flow site. The dimensions of each section were 3 m in width by 30 m in length and the system was graded to a five percent slope. The site was planted with orchard grass and tall feacue. A one-year acclimation period was allowed to obtain a good cover onset of the study to establish a high level of microbial activity. Applied wastewater as well as surface and subsurface flows were monitored for NO-3, NH+4, TKN, BOD, suspended solids, pH, conductivity, and total phosphorus. The results indicate excellent warm weather performance for removal of oxygen demanding substances, suspended solids remained high throughout the winter while treatment of SOD declined to unacceptable levels at soil temperatures below 4C. Nitrogen treatment efficiency of suspended solids remained high throughout the winter while treatment of SOD declined to unacceptable levels at soil temperatures below 4C. Nitrogen treatment declined rapidly below 14C. The form of airogen applied to overland flow was found to affect performance with nitrate being the less desirable form. Phosphorus treatment by overland flow was found to be shout 80% in the summer months, declining to nil during the winter.

MP 1280

LOW-FREQUENCY SURFACE IMPEDANCE MEASUREMENTS AT SOME GLACIAL AREAS IN THE UNITED STATES.

Arcone, S.A., et al, Radio science, Jan.-Feb. 1980, 15(1), p.1-9, 14 refs. Delaney, A.J.

Delaney, A.J. 34-2674

RADIO WAVES, WAVE PROPAGATION, RADIO COMMUNICATION.

Measurements of apparent resistivity and phase derived from the complex surface impedance of radio waves propagating in the ground wave mode at frequencies in the radio navigational aid band (between 257 and 382 kHz) are presented. Areas encompassing between 400 and 800 aq km that covered a variety of glacial sediments, land forms, and some crystalline bedrock types were surveyed. The degree of dispersion found in resistivity values reflects the dispersion in grain size, while the average resistivity increases with mean grain size, while the average resistivity increases with mean grain size. size. Dielectric properties are suggested as one cause of the low phases observed over crystalline bedrock. The combination of apparent resistivity and phase data implies that the resistivity measurements are consistent in about 50% of the areas with previous measurements of field strength attenuation performed in the AM broadcast band.

MP 1281

MARGIN OF THE GREENLAND ICE SHEET AT ISUA.

Colbeck, S.C., et al, Journal of glaciology, 1979, 24(90), p.155-165, In English with French and German summaries. 7 refs.

34-2824

ICE SHEETS, ICE EDGE, DRILL CORE ANAL-YSIS, ICE STRUCTURE.

YSIS, ICE STRUCTURE.

Field studies at a particular place at the margin of the Greenland ice sheet have provided information about the ice sheet.

Ice temperatures were measured in five drill boles, two of which reached the unfrozen area of basal melting. Surface water entered these two bore holes, reaching the base in one, but remaining 59 m above the base in the other. The existence of this water conduit or fracture at 240 m depth, the calculated temperature profiles, and the local bedrock configuration suggest an area of stationary ice overridden by the ice sheet. This situation suggests are creep rupture at depth in the ice sheet. Toe-fabric analysis made above 240 m depth shows patterns similar to fabrics under the part of the part of

MP 1282

RELATIONSHIP OF ULTRASONIC VELOCIT-IES TO CAXIS FABRICS AND RELAXATION CHARACTERISTICS OF ICE CORES FROM BYRD STATION, ANTARCTICA.

Gow, A.J., et al, *Journal of glaciology*, 1979, 24(90), p.147-153, In English with French and German summaries. 12 refs.

Kohnen, H.

ICE SHEETS, ICE MECHANICS, DRILL CORE ANALYSIS, RELAXATION (MECHANICS), UL-TRASONIC TESTS, ANTARCTICA—BYRD STA-TION.

TION.

Deep corea from Byrd Station were used to calibrate an ultrasonic technique of evaluating crystal anisotropy in the antarctic ice sheet. Velocities measured parallel and perpendicular to the vertical axis of the cores yielded data in excellent agreement with the observed c-axis fabric profile and with the in-situ P-wave velocity profile measured parallel to the bore-hole axis by Bentley. Velocity differences in excess of 140 m/s for cores from below 1,300 m attest to the tight clustering of c axes of crystals about the vertical, especially in the zone 1,300-1,800 m. A small but significant decline in vertical velocity with ageing of the core, as deduced from Bentley's down-hole data, is attributed to the formation of oriented cracks that occur in the ice cores as they relax from environmental stresses. This investigation of cores from the 2,164 m thick ice sheet at Byrd Station establishes the ultrasonic technique as a viable method of monitoring relaxation characteristics of drilled cores and for determining the gross trends of c axis orientation in ice sheets. The Byrd Station data, in conjunction with Barkov's investigation of deep cores from Vostok, East Antarctica, also indicate that crystal anisotropy in the antarctic ice sheet is dominated by a clustering of c-axis about a vertical symmetry axis. (Auth.)

ANALYSIS OF CIRCULATION PATTERNS IN GRAYS HARBOR, WASHINGTON, USING REMOTE SENSING TECHNIQUES.

Gatto, L.W., Marine geodesy, 1980, Vol.3, p.289-323,

34-2675

REMOTE SENSING, TIDAL CURRENTS, WATER FLOW

The objective of this investigation was to analyze surface circulation patterns in Grays Harbor, Washington, during flood and eab tide, using National Aeronautics and Space Administration (NASA) aerial photographs and thermal-IR

imagery and low altitude aerial photographs of uranine dye drogues. The application of LANDSAT-1 and passive microwave imagery was evaluated but did not prove useful. Water temperature, aslinity, and suspended aediment data and the results of hydraulic model studies were used to verify and supplement interpretations from the photographs and imagery. The use of remost sensing techniques in conjunction with ground truth data and hydraulic model results, when available, provides a more complete perspective of estuarine processes than is available by using conventional shipboard surveys alone.

IMAGING RADAR OBSERVATIONS OF FROZ-EN ARCTIC LAKES.

Elachi, C., et al. Remote sensing of environment, 1976, 5(3), p.169-175, 14 refs.
Bryan, M.L., Weeks, W.F.

34-2580

34-2580
RADAR ECHOES, FROZEN LAKES, BACK-SCATTERING, REMOTE SENSING, BUBBLES, ICE_WATER INTERFACE, ICE SOLID INTER-FACE.

FACE.

L-band radar images of a number of ice-covered lakes located approx 48 km northwest of Bethel, Alaska, show large differences in radar backscatter with lakes showing homogeneous low-returns, homogeneous high-returns and/or low-returns around the lake borders and high-returns from the central areas. The patterns of the returns suggest that a low-return indicates that the lake is frozen completely to its bottom, while a high-return indicates the presence of freshwater between the ice cover and the lake bod. This interpretation is in good agreement with the limited information available on lake depths in the study area and recent X-band radar observations of North Slope lakes by Sellman, Weeks and Campbell, who suggested such an interpretation. These effects are, however, more striking in the L-band than in the X-band imagery. This can be explained by the fact that volume inhomogeneities, such as air bubbles, will cause more activering and conductivity losses and thus more attenuation at the shorter wavelengths (X-band, 3 cm).

MAED 1288

MP 1285

WATER MOVEMENT IN A LAND TREATMENT SYSTEM OF WASTEWATER BY OVERLAND FLOW.

Nakano, Y., et al, *Progress in water technology*, 1979, 11(4/5), p.185-206, 15 refs. Khalid, R.A., Patrick, W.H., Jr.

34-3949

WATER FLOW, WASTE TREATMENT, WATER TREATMENT, SOIL WATER, SATURATION, SEEPAGE, SLOPE ORIENTATION, EX-PERIMENTATION.

Water movement in an overland-flow land treatment system was studied experimentally and theoretically. A small-scale physical model was used to obtain experimental data. The theoretical analysis was based upon the shallow water equation for overland flow and the Darcy-Richards law for soil water flow. It was found that the water movement in the swater was remarkly overland by the application soil water flow. It was found that the water movement in the system was primarily controlled by the application rate, the friction slope, the slope angle, the hydraulic characteristics of soils, and the evapotranspiration. An approximate analytical solution to steady flow in the system was obtained. It was found that the rate of soil water flow was mainly determined by the saturated conductivity of soils and in less extent by the friction slope and the slope angle in the steady condition. A finite difference solution to non-steady flow was found satisfactory in simulating the experimental data.

MP 1286

MASS-BALANCE ASPECTS OF WEDDELL SEA

PACK-ICE.

Ackley, S.F., Journal of glaciology, 1979, 24(90), p.391-405, In English with French and German summaries. 20 refs.

SEA ICE DISTRIBUTION, MASS BALANCE, ICE DEFORMATION, SALINITY, WEDDELL SEA.

DEFORMATION, SALINITY, WEDDELL SEA.

The Weddell Sea pack ice undergoes several unique advanceretreat characteristics related to the clockwise transport in
the Weddell Gyre, the physical setting for the pack ice,
and the free boundary with the oceans to the north. From
satellite-derived ice charts, the annual cycle of the pack
ice advance and retreat is depicted. The Weddell pack
advance is characterized by a strong east-moving component
as well as the north advance seen in other regions such
as East Antarctics. Physical characteristics of the pack
ice at the summer minimum ice edge are presented. Indications are that deformation is a significant component of
the ice accumulation, deformed ice accounting for c. 15
to 20% of the area covered in the year-round pack. Ablation the ice accumulation, deformed ice accounting for c. 15 to 20% of the area covered in the year-round pack. Ablation characteristics are inferred from observations made during field work and from satellite imagery. These observations indicate that surface-melt ablation typically seen on Arctic pack is not seen on the Weddell pack inside the summer edge. Using the physical-property data and transport inferred from ship and iceberg drifts, a new annual ice accumulation > 3 m is inferred over the continental shelf in the South compared to <2 m previously estimated. The implication is the set of the continental shelf in the south compared to <2 m previously estimated. south compared to <2 m previously estimated. The implica-tion is that salt flux into the ocean over the shelf may be significantly larger, thereby increasing the production of Western Shelf Water, a component of Antarctic Bottom Water. (Auth.) (Auth.)

MP 1287

DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAPROST BENEATH THE REALIPORT SEA

BEAUFORT SEA.
Sellmann, P.V., et al, Environmental assessment of the
Alaskan continental shelf, Vol. 9, Hazards. Principal
investigators' annual reports for the year ending
March 1979, Boulder, Colorado, Outer Continental
Shelf Environmental Assessment Program, Oct. 1979,

Sheft Environmental Assessment Frogram, Oct. 1975, p.93-115, 19 refa.
Chamberlain, E.J., Arcone, S.A., Blouin, S.E., Delaney, A.J., Neave, K.G. 34-3056
SUBSEA PERMAFROST, PERMAFROST DISTRI-BUTION, BOTTOM SEDIMENT, BOREHOLES, TEMPERATURE MEASUREMENT, ENGINEER-ING GEOLOGY, SEISMIC SURVEYS, SHORE DRILLING, SEASONAL FR THAW, BEAUFORT SEA. FREEZE

THAW, BEAUFORT SEA.

The objective of CRREL's subsea permafrost program is to obtain information on the distribution and properties of permafrost beneath the Besufort Sea. We are currently acquiring information on the distribution of ice-bunded permafrost from analysis of the velocity structure of commercial seismic records. This report summarizes the results of all studies to date, including engineering property analysis and preliminary interpretation of seismic data. Emphasis is placed on results that are relevant to offshore development of this region.

Discussion of the CRREL drilling and laboratory program represents the most current interpretation of these data.

MP 1288

MP 1288
BURIED VALLEYS AS A POSSIBLE DETERMINANT OF THE DISTRIBUTION OF DEEPLY BURIED PERMAFROST ON THE CONTINENTAL SHELF OF THE BEAUFORT SEA.

Hopkins, D.M., et al, Environmental assessment of the Alaskan continental shelf. Vol. 9. Hazards. Principal Ansata Continental Stein, vol. 9, Plazatus. Principal investigators' annual reports for the year ending March 1979, Boulder, Colorado, Outer Continental Shelf Environmental Assessment Program, Oct. 1979,

p.135-141, 15 refs. Sellmann, P.V., Chamberlain, E.J., Lewellen, R.I., Robinson, S.W.

34-3057

Subsea Permafrost, Permafrost Distri-BUTION, BOREHOLES, BOTTOM SEDIMENT, RIVER BASINS, VALLEYS, BEAUFORT SEA.

MP 1289

OIL POOLING UNDER SEA ICE.

Kovaca, A., Environmental assessment of the Alaskan continental shelf, Vol.8, Transport. Principal investigators' annual reports for the year ending March 1979, Boulder, Colorado, Outer Continental Shelf Environmental Assessment Program, Oct. 1979, p.310-34-3053

34-303
OIL SPILLS, SEA ICE, ICE ELECTRICAL PROPERTIES, BOTTOM ICE, FAST ICE, SUBGLACIAL OBSERVATIONS, OCEAN CURRENTS, ANISOTROPY, REMOTE SENSING, ECHO SOUNDING, ELECTROMAGNETIC PROPERTIES.

ING, ELECTROMAGNETIC PROPERTIES.
The object of the CREEL study is to: (a) determine the cause of the significant relief which exists under the fast ice, (b) measure the variations in the relief under fast ice, using electromagnetic echo sounding, (c) determine if the under-ice relief is: series of individual pockets or consists of long rills, (d) estimate the quantity of oil which could pool up in the under-ice depressions should oil be released under the ice cover (c) use impulse radar to study the electromagnetic properties and anisotropy of sea ice. Initial results from using a polarized redar antenna in the air from the NOAA helicopter indicate that the c-axis anisotropy can be determined from the sir. Because this anisotropy is related to current direction, it should be possible to measure, from an airborne platform, the current direction at the ice/water interface.

MP 1291

DYNAMICS OF NEAR-SHORE ICE.

Kovacs, A., et al. Environmental assessment of the Alaskan continental shelf, Vol. 7, Transport. Principal investigators' annual reports for the year ending March 1979, Boulder, Colorado, Outer Continental Shelf Environmental Assessment Program, Oct. 1979, p.181-207, 2 refs. Weeks, W.F. 34-3051

ICE MECHANICS, SEA ICE, ICE COVER THICK-NESS, ICE STRUCTURE, ICE CRYSTALS, PRES-SURE RIDGES, REMOTE SENSING, FAST ICE,

INTERNATIONAL WORKSHOP ON THE SEA-

INTERNATIONAL WORKSHOP ON THE SEA-SONAL SEA ICE ZONE, MONTEREY, CALI-FORNIA, FEB. 26-MAR.1, 1979.
Andersen, B.G., ed, Cold regions science and tech-nology, Apr. 1980, Vol.2, 357p., For individual papers see 34-3625 through 34-3632 or B-23446, F-23442 through F-23445, and F-23447.
Weeks, W.F., ed, Newton, J.L., ed. 34-3624

MEETINGS, SEA ICE, PACK ICE, ICE PILEUP, ACOUSTICS, CLIMATOLOGY, ECOLOGY, OCEANOGRAPHY.

This volume comprises a series of state-of-the-art papers by individual authors, followed by disciplinary panel statements offering research suggestions and identifying particular prob-lems with the discipline under consideration. Several interdisciplinary panel reports are included—air-sea-ice interactions, biological interactions, engineering interactions, and acoustic interactions.

MP 1293

OVERVIEW (INTERNATIONAL WORKSHOP ON THE SEASONAL SEA ICE ZONE).

Weeks, W.F., Cold regions science and technology, Apr. 1980, Vol.2, p.1-35, 2 refs. 34-3625

34-3625
SEA ICE DISTRIBUTION, SEASONAL VARIATIONS, MEETINGS, MODELS, AIR WATER INTERACTIONS, ICE WATER INTERFACE,
METEOROLOGY, ENGINEERING, OCEANOG-RAPHY, OFFSHORE DRILLING.

RAPIT, OPPSHORE DRILLING.

This overview is an attempt to summarize the principal conclusions that can be drawn from the workshop. The article is divided into three sections: disciplinary studies (ice, oceanography, meteorology and climatology, biological regimes, hydroscoustics, coastal processes); interdisciplinary studies; and engineering aspects of offshore resource exploration in the polar regions. Modeling of a wide variety of processes is discussed.

MP 1294 PHYSICAL OCEANOGRAPHY OF THE SEA-SONAL SEA ICE ZONE.

McPhee, M.G., Cold regions science and technology, Apr. 1980, Vol.2, p.93-132, Refs. p.116-118. In-cludes disciplinary panel statement, p.119-132.

34-3627 POLYNYAS, OCEANOGRAPHY, SEA ICE, ICE WATER INTERFACE, SEASONAL TIONS, SALINITY, ICE EDGE. VARIA-

Truns, SALIMITY, ICB BDGE.

This literature review is divided into four parts. The first deals with the role of continental shelves at the margins of polar oceans in maintaining water masses; the acound emphasizes how the ocean might affect the advance and retreat of ice not contained by land; the third describes some special conditions found in the shear zone; and the fourth is a brief look at experimental techniques and instru-

MP 1205 SHORE ICE PILE-UP AND RIDE-UP: FIELD OBSERVATIONS, MODELS, THEORETICAL ANALYSES.

Kovacs, A., et al, Cold regions science and technology, Apr. 1980, Vol.2, p.209-298, Refs. p.282-288. Includes disciplinary panel statement. Sodhi, D.S.

34-3631

SHORES, COASTAL TOPOGRAPHIC FEA-TURES, ICE PILEUP, SEA ICE, FAST ICE, PRES-SURE RIDGES, MATHEMATICAL MODELS.

MP 1296 NUMERICAL MODELING OF SEA ICE IN THE

SRASONAL SEA ICE ZONE. Hibler, W.D., III, Cold regions science and technology, Apr. 1980, Vol.2, p.299-356, Refs. p.317-320. Includes disciplinary panel statement.

SEA ICE, SEASONAL VARIATIONS, COMPUT-ERIZED SIMULATION, ICE MODELS, MATH-EMATICAL MODELS.

Various approaches to modelling see ice have been tried by investigators; the author discusses the suitability of different types of simulations for particular research goals. Empirical studies are also reviewed. Literature covered relates to ice in both arctic and antarctic regions.

DYNAMICS OF SNOW AND ICE MASSES.

Colbeck, S.C., ed, New York, Academic Press, 1980, 468p., Numerous refs. passim., Numerous refs. For individual papers see 34-3656 through 34-3662 or F-23452 through F-23455.

ICE SHEETS, ICE SHELVES, GLACIERS, SEA ICE, ICEBERGS, AVALANCHES, SNOW, ICE. This book reviews the dynamical aspects of snow and ice masses on the geophysical scale. It is divided into seven chapters, each of which describes the besic features of a particular snow or ice mass. In each chapter a conceptual framework is established on a physical basis, and a mathematical description is provided with as many references to the technical literature as space allows. No strempt is made to address particular applications of the information, but the physical and mathematical descriptions of the properties and processes provide for both an understanding of snow and ice masses and a basis through which particular problems

MP 1298
SEA ICE GROWTH, DRIFT, AND DECAY.
Hibler, W.D., III, Dynamics of anow and ice masses,
edited by S.C. Colbeck, New York, Academic Press,
1980, p. 141-209, Refs. p.205-209.
34-3658

34-3658
DRIFT, SEA ICE, THICKNESS, ICE COVER
THICKNESS, ICE SURFACE, ICE FORMATION,
MODELS, ICE STRENGTH, SIMULATION.
This review of the dynamics of sea ice is organized into
the following sections: general characteristics of sea ice;
physics of sea ice growth, drift and decay (ice thickness
distribution, thermal processes and ice drift and deformation);
and numerical simulation of sea ice growth, drift and decay.

PRESHWATER ICE GROWTH, MOTION, AND DECAY.

Ashton, G.D., Dynamics of snow and ice masses, edit-

dby S.C. Colbeck, New York, Academic Press, 1980, p.261-304, Refs. p.302-304.
34-3660
LAKE ICE, RIVER ICE, FRAZIL ICE, RIVERS, ICE JAMS, ICE BREAKUP, ICE MELTING, ICE FLOES, ICE FORMATION.

MP 1300 SOME PROMISING TRENDS IN ICE ME-CHANICS

Assur, A., Symposium on Physics and Mechanics of Ice, Copenhagen, Aug. 6-10, 1979. Proceedings. Edited by P. Tryde, Berlin, Springer-Verlag, 1980, p.1-15, 12 refs.

34-3728
ICE MECHANICS, ICE CREEP, ICE SHEETS,
STRESSES, LOADS (FORCES), ICE MODELS,
RHEOLOGY, ICE COVER THICKNESS, SEA ICE,
ANALYSIS (MATHEMATICS).

ANALYSIS (MATHEMATICS).

lee sheets are inhomogeneous; properties vary strongly with depth. Theoretical treatment of plates with properties varying perpendicular to the plate has now been satisfactorily developed for floating ice sheets.

However, other problems are still waiting for solutions. The use of model ice is developing rapidly.

Some suggestions of how to analyze such ice are made.

Breakthrough-loads on ice sheets diminish with duration of loading, but no satisfactory solution is available based upon classical procedures of applied mechanica.

REF 1391 EXPERIENCE GAINED BY USE OF EXTEN-SIVE ICE LABORATORY FACILITIES IN SOLV-ING ICE PROBLEMS.

Frankenstein, G.E., Symposium on Physics and Mechanics of Ice, Copenhagen, Aug. 6-10, 1979. Proceedings. Edited by P. Tryde, Berlin, Springer-Verlag, 1980, p.93-103, 12 refs.
34-3735

34-3735
ICB MBCHANICS, ICB NAVIGATION, ICB CONDITIONS, OFFSHORE STRUCTURES, ICE LOADS, FLOATING ICE, ICING, ICE PILEUP, FLOODING, LABORATORY TECHNIQUES.

PLOODING, LABORATORY TECHNIQUES.

The discovery of offshore oil in ice-infested waters has caused major concern to the design engineers.

Some of the problems associated with offshore structures are ice forces, ichag, and pile-up. Laboratory facilities have and will continue to solve many of the ice problems have been solved primarily due to laboratory studies. Also, the results of ice forces due to ice uptift have been virtually eliminated by controlled studies. Laboratories are becoming larger and more sophisticated.

This should result in an increase in laboratory studies and a decrease in field studies. Solutions will come faster because conditions can be precisely controlled.

MP 1302 MECHANICAL PROPERTIES OF POLYCRYS-TALLINE ICE.

Mellor, M., Symposium on Physics and Mechanics of Ice, Copenhagen, Aug. 6-10, 1979. Proceedings. Bdited by P. Tryde. Berlin, Springer-Verlag, 1980, p.217-245.

34-3/44
ICE CRYSTALS, ICE MECHANICS, ICE ELASTICITY, ICE CREEP, ICE STRENGTH, ICE
CRACKS, VISCOBLASTICITY, STRESS STRAIN
DIAGRAMS, BRITTLENESS, TEMPERATURE

MP 1303

BENDING AND BUCKLING OF A WEDGE ON AN ELASTIC FOUNDATION.

Nevel, D.E., Symposium on Physics and Mechanics of Ice, Copenhagen, Aug. 6-10, 1979. Proceedings. Edited by P. Tryde, Berlin, Springer-Verlag, 1980, p.278-288, 5 refs.

34-3747

ICE WEDGES, FOUNDATIONS, ELASTIC PROP-ERTIES, ICE CRACKS, FLEXURAL STRENGTH, LOADS (FORCES), ICE DEFORMATION, ANAL-YSIS (MATHEMÁTICS).

When an ice sheet begins to slide up a sloping structure, the ice cracks radially form the structure creating wedges. Beam theory is used ω analyze these wedges under the influence of both horizontal and vertical forces. Buckling and bending of these wedges are considered.

MP 1304 ICE FORCES ON THE YUKON RIVER BRIDGE
—1978 BREAKUP.

nson, P.R., et al, U.S. Federal Highway Administration. Offices of Research and Development. Report, Feb. 1979, FHWA-RD-79-82, 40p., PB80-144 553, 19 refs.

McFadden, T. 34-3725

PIERS, BRIDGES, ICE LOADS, ICE PRESSURE, ICE MECHANICS, ICE STRENGTH, IMPACT STRENGTH, ICE BREAKUP, RIVER ICE.

MP 1305 THE ICEBERG COMETH.

Weeks, W.F., et al, Technology review, Aug.-Sep. 1979, 81(8), p.66-75, 6 refs. Mellor, M.

34-3793

ICEBERG TOWING.

The potential of towing icebergs to arid regions in the Southern Hemisphere is reviewed. Formidable technical problems exist; some proposed solutions are listed. However, very little has been done to test the technology proposed. Towing, insulation, routes, and other aspects of iceberg-towing technology should be investigated by a trial tow to Western Australia, the area most favorably located for southern iceberg delivery. MP 1306

PRESSURE WAVES IN SNOW.

Brown, R.L., Journal of slaciology, 1980, 25(91), p.99-107, 9 refs., In English with French and German summaries. 34-3802

SHOCK WAVES, SNOW DENSITY, LOADS (FORCES), SNOW STRENGTH, SHEAR STRESS, SNOW COMPRESSION, ANALYSIS (MATH-EMATICS).

EMATICS).

A dynamic constitutive law is used to study the response of medium-density snow to shock waves. The results show good correlation between theory and experiment, except for low-intensity shocks which produce small permanent density changes. In this case the validity of the data is questioned, although further experimental work is needed to settle this question. The results of this work also partially explain why snow is so effective in absorbing energy associated with stress waves. " is is felt to be due to the work-hardening characteristics of snow.

MP 1307 APPLICATION OF RECENT RESULTS IN FUNCTIONAL ANALYSIS TO THE PROBLEM OF WETTING FRONTS.

Nakano, Y., Water resources research, Apr. 1980, 16(2), p.314-318, 16 refs. 34-3948

YSIS (MATHEMATICS).

Traditionally, in hydrology and soil physics, wetting fronts appearing in porous media described by Darcy's law have not generally been considered to be singular surfaces. Some recent results from functional analysis are presented as evidence supporting the viewpoint that wetting fronts with a finite propagating speed generally are singular surfaces.

MP 1306 TIME-PRIORITY STUDIES OF DEEP ICE CORES.

Gow, A.J., Glaciological data, May 1980, GD-8, p.91-102, 18 refs.

ICE CORES, DRILL CORE ANALYSIS, ANTARC-TICA—BYRD STATION.

TICA—BYRD STATION.

Both the Greenland and Antarctic ice sheets have been successfully core-drilled to bedrock, 1390 m at Camp Century, Greenland in 1966 and 2164 m at Byrd Station, Antarctica in 1968. Core and borehole studies at both sites have revealed a wealth of interesting results, especially at Byrd Station where extensive studies of cores were begun as soon as they were pulled out of the drill hole. Continuing investigations of these Byrd Station drill cores, including recent observations of apparent widespread recrystallization in certain sections of ice core, further confirm the importance

of initiating as many studies as possible at the drill site. Any list of the studies that should be conducted on deep ice cores must recognize two kinds of research: 1) those studies of a time-priority nature that must be initiated as soon as cores are pulled to the surface and, 2) other essential studies in which relaxation of the ice is not a factor. These latter studies can generally be deferred until cores are transported to more permanent storage facilities outside Antarctica. (Auth. mod.)

SMALL-SCALE TESTING OF SOILS FOR FROST ACTION.
Sayward, J.M., Geotechnical testing journal, 1979, 2(4), p.223-231, 18 refs.
34-3990

FROST ACTION, FROST HEAVE, ICE NEEDLES, SOIL WATER MIGRATION, SOIL TESTS.

SOIL WATER MIGRATION, SOIL TESTS.

A method is described for convenient study of frost action, including soil heaving and needle ice formation. The apparatus is simple and small and the procedure requires only 25 cu cm soil specimens. The method could be useful for screening either large numbers or limited quantities of soils or soil additives for frost susceptibility. The method described was used to perform a limited number of tests with several soils. The tests obtained action in the form of soil heave, ice heave, or ice needles, yielding maximum for soil heaves and 3 to 7 or more mm/h for ice heaves and ice needles. Initial trials showed that thickener additives and possibly other treatments can restrict frost action.

MP 1310 FATE AND EFFECTS OF CRUDE OIL SPILLED ON SUBARCTIC PERMAFROST TERRAIN IN INTERIOR ALASKA.

Johnson, L.A., et al, U.S. Environmental Protection Agency. Environmental Research Laboratory. Report, Mar. 1980, EPA-600/3-80-040, 128p., Refs.

Sparrow, B.B., Jenkins, T.F., Collins, C.M., Davenport, C.V., McFadden, T. 34-4079

OIL SPILLS, PERMAPROST THERMAL PROPERTIES, ENVIRONMENTAL IMPACT, THERMAL REGIME, SUBARCTIC REGIONS, SEASONAL VARIATIONS, EXPERIMENTATION.

SONAL VARIATIONS, EXPERIMENTATION. This study was conducted to determine both the short-and long-term effects of spills of hot Prudhoe Bay crude oil on permafrost terrain in subarctic interior Alaska. Two experimental oil spills of 7570 liters (2000 gallons) each on 500 aq m test plots were made at a forest site underlain by permafrost near Pairbanks, Alaska. The oil spills, one in winter and one in summer, were conducted to evaluate their effect during these two seasonal extremes. Oil movement, thermal regime, botanical effects, microbiological responses, permafrost impact, and composition of the oil in the soil were monitored for two years.

MP 1311

MP 1311
PREE CONVECTION HEAT TRANSFER CHARACTERISTICS IN A MELT WATER LAYER.
Yen, Y.-C., American Society of Mechanical Engineers.
Transactions, Aug. 1980, 102(3), p.550-556,

17 refs.

35-103 MELTWATER, HEAT TRANSFER, CONVECTION, ICE WATER INTERFACE, WATER TEMPERATURE EFFECTS, ICE MELTING, ANALYSIS (MATHEMATICS).

PERATURE, TEMPERATURE EFFECTS, ICE MBLITING, ANALYSIS (MATHEMATICS). An experimental study was conducted on the formation of a water layer containing a maximum density, its effect on the onset of convection, and the heat transfer characteristics of such a system. This water layer was formed by one odimensional melting (either from below or above) of a cylinder of bubble-free ice. The layer depth at the onset of convection was determined by locating the inflection point on the water layer depth versus time curve, and was compared with layer depth calculated from a linear stability analysis of an identical problem. The results were compared with the analytical work of Veronia and were found to be in excellent agreement. Formation of a constant temperature layer was observed by measuring the water temperature layer was observed by measuring the water temperature was found to depend on T(h) (warm plate temperature) for melting from below, but had a weaker dependence for melting from above. The heat flux to the melting surface increased inhearly with T(h) for melting from below, but had a weaker dependence for melting from above. Non-dimensional mean temperature profiles of the water layer were found to be in good agreement with those by Adrian for melting from above. In the case of melting from below, he mean temperature profile also fell into a single line with a somewhat higher value in the convection layer.

SNOW STUDIES ASSOCIATED WITH THE SIDEWAYS MOVE OF DYE-3.
Tobiasson, W., Bastern Snow Conference, 36th. Pro-

ceedings, Alexandria Bay, New York, 1979, p.117-124, 4 refs. 34-4210

34-4210
SNOW STRENGTH, BEARING STRENGTH, FOUNDATIONS, STRESSES, SNOW COVER STABILITY, SNOW SURVEYS.
In 1977, DEW Line station DYE-3 on the Greenland Ice Cap was moved sideways 210 ft (64 m) onto a new undistorted foundation. When this life extension concept was proposed, abrupt failure of the supporting snow was a major concern. Snow samples were obtained and strength tested at CRREL to determine the chance of an abrupt failure of the supporting snow. Model studies were also performed to determine the bearing capacity of the snow, and predictions were made of foundation settlement during the move. The results indicated that the move could be accomplished safely.

REMOVAL OF VOLATILE TRACE ORGANICS FROM WASTEWATER BY OVERLAND FLOW LAND TREATMENT.

Jenkins, T.F., et al, Journal of environmental science and health: Part A. Environmental science and engineering, 1980, A15(3), p.211-224, 14 refs. Leggett, D.C., Martei, C.J. 34-4200

WASTE TREATMENT, WATER TREATMENT, WASTE DISPOSAL.

WASTE DISPOSAL. A prototype overland flow land treatment system was studied to determine its effectiveness in reducing the levels of volatile trace organics in municipal wastewater. Chlorinated primary wastewater, water collected from the surface at various points downslope and runoff were analyzed by GC/MS, using a purge and trap sampler. Results indicated that efficient removal of a number of volatile substances including chloroform and tolutene can be achieved by this method of treatment. Loss of these substances was found to follow first order kinetics. The observed behavior is consistent with a volatilization process. zation process.

MP 1314

WORKSHOP ON ENVIRONMENTAL PROTECTION OF PERMAPROST TERRAIN.

Brown, J., et al, Northern engineer, Summer 1980, 12(2), p.30-36, 8 refs. Hemming, J.E. 34-4102

34-4198

PERMAFROST PRESERVATION, ENVIRON-MENTAL PROTECTION, MEETINGS, THER-MAL EFFECTS, SOIL EROSION, ROUTE SUR-VEYS, SITE SURVEYS, DESIGN CRITERIA.

MP 1315

BREAK-UP OF THE YUKON RIVER AT THE

HAUL ROAD BRIDGE: 1979.
Stephens, C.A., et al, Fairbanks, University of Alaska, Sep. 1979, 22p. + Figs., 5 refs. Report of field activi-

Hanscom, J.T., Osterkamp, T.E. 34-4103

RIVER ICE, ICE BREAKUP, ICE COVER THICK-NESS, ICE FLOBS, ICE ELECTRICAL PROPERTIES, WATER TEMPERATURE, ELECTRICAL RESISTIVITY, VELOCITY, UNITED STATES—ALASKA—YUKON RIVER.

MATERIALS AVAILABILITY STUDY OF THE DICKEY-LINCOLN DAM SITE.

Merry, C.J., et al, Case studies of applied advanced data collection and management, American Society of Civil Engineers, 1980, p.158-170, Also presented at the 12th International Symposium on Remote Sensing of Environment, Manila, Philippines, April 20-26, 1978

McKim, H.L., Blackey, E.A. 35-153

33-133 EARTH DAMS, SITE SURVEYS, GEOLOGIC STRUCTURES, REMOTE SENSING, CON-STRUCTION MATERIALS, LAKES, TOPO-GRAPHIC FEATURES, MAPPING.

BREAK-UP DATES FOR THE YUKON RIVER; PT.1. RAMPART TO WHITEHORSE, 1896-1978. Stephens, C.A., et al, Fairbanks, University of Alaska, Geophysical Institute, Apr. 1979, c50 leaves, 10 refs. Fountain, A.G., Osterkamp, T.E. 35-133

ICE BREAKUP, ICE DETERIORATION, ICE CONDITIONS, ICE NAVIGATION, STATISTI-CAL ANALYSIS, UNITED STATES—ALASKA—

BREAK-UP DATES FOR THE YUKON RIVER; PT.2. ALAKANUK TO TANANA, 1883-1978. Stephens, C.A., et al, Fairbanks, University of Alasks, Geophysical Institute, May 1979, c50 leaves, 8 refs. Fountain, A.G., Osterkamp, T.E.

33-134 RIVER ICE, ICE BREAKUP, STATISTICAL ANALYSIS, ICE NAVIGATION, ICE CONDI-TIONS, UNITED STATES—ALASKA—YUKON RIVER

MP 1319

ICE SHEET INTERNAL RADIO-ECHO RE-FLECTIONS AND ASSOCIATED PHYSICAL PROPERTY CHANGES WITH DEPTH.

Ackley, S.F., et al, Journal of geophysical research, Sep. 10, 1979, 84(B10), p.5675-5680, 13 refs. Keliher, T.E. 34-999

ICE SHEETS, ICE CORES, RADIO ECHO SOUNDINGS, ICE PHYSICS, ANTARCTICA— FOLGER, CAPE.

In this paper, the measured physical properties of core to bedrock taken at Cape Polger, East Antarctica, are used to compute a depth-reflection coefficient profile for comparison with the observed radio-echo reflections. The measurements available on physical properties are density variations, bubble size and shape changes, and crystal fabric variations. In calculations to differentiate the effects of the physical properties, it appears that density variations account for the primary contributions to the calculated dielectric property changes corresponding to the highest observed reflection coefficients. However, bubble changes alone can also account for reasonable, though lower, reflection coefficients at the depths corresponding to the properties of the depths corresponding to the property changes. with the observed radio-echo reflections The me

though lower, reflection coefficients at the depths corresponding to observed reflections. Crystal fabric variations correspond poorly with the reflection locations. The close correspondence between the depths of the bubble shape changes (which are definitely deformational features) and the depths of the density variations, and between both of these and the radio-cohe layers, indicates that deformational events in the ice sheet's history are represented by the variations in physical properties and associated radio-echo records. (Auth. mod.)

MP 1320 "PACE ICE AND ICEBERGS"—REPORT TO POAC 79 ON PROBLEMS OF THE SEASONAL SEA ICE ZONE: AN OVERVIEW.

Weeks, W.F., et al, International Conference on Port and Ocean Engineering Under Arctic Conditions, 5th, Trondheim, Norway, Aug. 13-18, 1979. Proceed-ings, Vol.3. Trondheim, University, 1979, p.320-337. Denner, W.W., Paquette, R.G.

PACK ICE, ICEBERGS, SEA ICE DISTRIBUTION, ICE CONDITIONS, ICE PHYSICS, REMOTE SENSING, RESEARCH PROJECTS, SEASONAL VARIATIONS, SEA WATER.

VARIATIONS, SEA WATER.

This paper reports the results of the Sessonal Sea Ice Zone (SSIZ) Workshop, held February 26, 1979 in Monterey, California. The purpose of the workshop was to summarizent he existing knowledge of the SSIZ, to identify significant problem areas, and discuss approaches to finding solutions. The purpose of the report is to make the participants of POAC 79 aware of the important research problems of the SSIZ identified at the Workshop.

MP 1321

PROCEEDINGS OF THE SPECIALTY CONFER-ENCE ON COMPUTER AND PHYSICAL MOD-ELING IN HYDRAULIC ENGINEERING.

Ashton, G.D., ed, New York, American Society of Civil Engineers, 1980, 492p., Refs. passim. For selected paper see 34-4161. 35,254

HYDRAULICS, ENGINEERING, COMPUTER APPLICATIONS, ICE PHYSICS, MODELS.

REVIEW OF BUCKLING ANALYSES OF ICE SHEETS.

Sodhi, D.S., et al, U.S. Army Cold Regions Research and Engineering Laboratory, June 1980, SR 80-26, p.131-146, ADA-089 674, 14 refs.
Nevel, D.E.

ICE SHEETS, ICE LOADS, ICE PRESSURE, ICE STRENGTH, ANALYSIS (MATHEMATICS),

PLATES.

A review of the buckling analyses of floating ice sheets is presented. The theory used is that of a beam or plate on an elastic foundation. For beams, the results for all possible boundary conditions are presented and discussed. For plates, results of numerical solutions for a semi-infinite plate loaded over part of its boundary are presented and discussed. One solution is presented for an infinite plate loaded radially at a hole in the plate. In addition, results for wedge-shaped beams and plates are presented and discussed. Wedge-shaped ice sheets frequently occur due to previous cracking in the ice.

INVESTIGATIONS OF SEA ICE ANISOTROPY, ELECTROMAGNETIC PROPERTIES. STRENGTH AND ORIENTATION. UNDER-ICE

Kovacs, A., et al. Memorial University of Newfoundland. Centre for Cold Ocean Resources Engineering. C-CORE publication, May 1980, No.80-5, p.109-153,

Morey, R.M.

35-500
SEA ICE, ANISOTROPY, ELECTROMAGNETIC PROPERTIES, ICE STRENGTH, OCEAN CURRENTS, SUBGLACIAL OBSERVATIONS, REMOTE SENSING, ICE PHYSICS, ICE COVER THICKNESS, ICE WATER INTERPACE, ICE CRYSTAL STRUCTURE.

MP 1324

HF TO VHF RADIO FREQUENCY POLARIZA-TION STUDIES IN SEA ICE AT PT. BARROW,

Arcone, S.A. et al. Memorial University of New foundland. Centre for Cold Ocean Resources Engineering. C-CORE publication, May 1980, No.80-5, neering. C-COR p.225-245, 8 refs. Delaney, A.J. 35-553

SEA ICE, FAST ICE, POLARIZATION (WAVES), ANISOTROPY, ICE OPTICS, ICE COVER THICK-NESS, ELECTROMAGNETIC PROPERTIES.

NESS, ELECTROMAGNETIC PROPERTIES.
The frequency dependence of the polarization-rotation properties of fast ice upon radiowaves in the HF-VHF range were studied at Pt. Barrow, Alaska, in the early spring of 1979. Five sites were investigated at frequencies between 10 and 173 MHz and at each site cores were taken and then physical properties measured. The polarization was studied with a pair of crossed dipole antennas, one a transmitter, the other a receiver, both of which were rotated simultaneously as a fixed unit. This procedure was designed to produce a four-lobe cloverleaf pattern with maximum coupling occurring when the antennas were aligned at 45 deg to the c-axis direction. The results showed strongest polarization between about 35 and 65 MHz. Above this band the high de conductivity of the sea ice which was measured accounts for the lack of cross coupling, but it is not yet understood why the data was so erratic below this band. Reperimental difficulties are also discussed.

MP 1325

MODELING OF ANISOTROPIC ELECTRO-MAGNETIC REFLECTION FROM SEA ICE.

Machellic Reflection From Sea ICE.
Golden, K.M., et al, Memorial University of Newfoundiand. Centre for Cold Ocean Resources Engineering. C-CORE publication, May 1980, No.80-5,
p.247-294, 21 refs.

Ackley, S.F. 35-554

33-334
SEA ICE, BRINES, ANISOTROPY, BLECTROMAGNETIC PROPERTIES, ICE OPTICS, ICE
WATER INTERFACE, DIBLECTRIC PROPERTIES, ICE STRUCTURE, POLARIZATION
(WAVES), MATHEMATICAL MODELS.

(WAVES), MATHEMATICAL MODELS.

The contribution of brine layers to observed reflective anisotropy of sea ice as 100 MHz is quantitatively assessed. The sea ice is considered to be a stratified, inhomogeneous, anisotropic dielectric consisting of pure ice containing ordered arrays of conducting inclusions (brine layers). Below the transition zone, the ice is assumed to have constant azimuthal caxis orientation within the horizontal plane, so the orientation of brine layers is uniform. The brine layers are also assumed to become increasingly well-defined with depth since adjacent brine inclusions tend to thus together with increasing temperature. A theoretical explanation for observed reflective anisotropy is proposed in terms of anisotropic electric flux penetration into brine layers. Penetration anisotropy and brine layer geometry are linked to anisotropy in the complex dielectric constant of sea ice. Subsequently, a numerical method of approximating the reflected power of a plane wave pulse incident on a slab of sea ice is presented and used to show the contribution of the above effects to the observed reflective anisotropy.

MP 1326

POINT SOURCE BUBBLER SYSTEMS TO SUP-PRESS ICE.

Ashton, G.D., Cold regions science and technology, Nov. 1979, 1(2), p.93-100, For another version see 33-35-695

33-693 ICE REMOVAL, BUBBLING, ICE MELTING, HEAT TRANSFER, ICE COVER THICKNESS, AIR TEMPERATURE, WATER TEMPERATURE, MATHEMATICAL MODELS.

An analysis of a point source bubbler system used to induce local melting of an ice cover is presented. The analysis uses empirical results of bubbler plume experiments and impringement heat transfer results to determine the rate of melting at the underside of an ice cover. Through a simple energy budget analysis of the ice cover, the melting of the ice cover and resulting extent of open water are determined as a function of air temperatures, depth and

air discharge of the source, and water temperature.

analysis leads to a numerical simulation and an exan
simulation is presented.

MP 1327

PREPARATION OF POLYCRYSTALLINE ICE SPECIMENS FOR LABORATORY EXPERI-MENTS.

Cole, D.M., Cold regions science and technology, Nov. 1979, 1(2), p.153-159, 10 refs.

ICE CRYSTALS, ICE SAMPLING, ICE STRUC-TURE, LABORATORY TECHNIQUES, ICE ME-CHANICS, POROSITY, BUBBLES.

MP 1328

MECHANICAL PROPERTIES OF POLYCRYS-TALLINE ICE: AN ASSESSMENT OF CURRENT ENOWLEDGE AND PRIORITIES FOR RE-SEARCH

Hooke, R.L., et al. Cold regions science and technology, Aug. 1980, 3(4), p.263-275, For another version see 33-3545.

Mellor, M. 35-744

JS-744 ICE CRYSTALS, ICE MECHANICS, ICE CREEP, ICE DEFORMATION, STRAIN TESTS, STRESS STRAIN DIAGRAMS, ICE STRENGTH.

MP 1329

SHIP RESISTANCE IN THICK BRASH ICE. Mellor, M., Cold regions science and technology, Aug. 1980, 3(4), p.305-321, 8 refs. 34.74R

ICE MECHANICS, ICE PRESSURE, SHIPS, IMPACT STRENGTH, ICE FRICTION, METAL ICE FRICTION, STRESSES, ICE NAVIGATION.

LOW TEMPERATURE PHASE CHANGES IN MONTMORILLONITE AND NONTRONITE AT HIGH WATER CONTENTS AND HIGH SALT CONTENTS.

Anderson, D.M., et al, Cold regions acience and technology, May 1980, 3(2/3), p.139-144, 8 refs. Tice, A.R. 35-728

UNFROZEN WATER CONTENT, SALINITY, TEMPERATURE EFFECTS, PHASE TRANSPORMATIONS, SOIL FREEZING, CLAYS, IONS, LOW TEMPERATURE TESTS.

LOW TEMPERATURE TESTS.

Prior work has revealed the existence of one or more low temperature phase changes in clay water systems in the temperature range -20C to about -50C. The number and the temperatures at which these phase changes appear seems to be associated with the type of exchangable ion(s) and the number and nature of individual water domains present. In this paper, we report the results of low temperature differential calorimetry on monimorillonite and nontronite clays at high water and high salt contents. The presence of electrolytes at high concentration is shown to have a very marked effect. The low temperature phase changes are completely absent at high electrolyte concentrations in these clay water systems. The presence of electrolytes also was observed to have a distinctive effect on the shape of the initial freezing peak associated with ice segregation.

MP 1331

MP 1331 FROST HEAVE IN AN INSTRUMENTED SOIL COLUMN.

Berg, R.L., et al, Cold regions science and technology, May 1980, 3(2/3), p.211-221, 4 refa. Ingersoll, J., Guymon, G.L. 35-737

FROST HEAVE, SOIL WATER, UNFROZEN WATER CONTENT, SOIL FREEZING, FROST PENETRATION, ICE FORMATION, TENSILE PROPERTIES, MEASURING INSTRUMENTS,

MP 1332

Takagi, S., Cold regions science and technology, May 1980, 3(2/3), p.233-236, 5 refs.

PROST HEAVE, ADSORPTION, SOIL PRES-SURE, SOIL WATER MIGRATION, F POINTS, WATER FILMS, THEROIES.

ONE-DIMENSIONAL FROST HEAVE MODEL BASED UPON SIMULTANEOUS HEAT AND WATER FLUX.

Guymon, G.L., et al, Cold regions science and technology, May 1980, 3(2/3), p.253-262, 23 refs. Hromadka, T.V., II, Berg, R.L. 35-742

PROST HEAVE, HEAT TRANSFER, SOIL WATER MIGRATION, SOIL FREEZING, MATHEMATICAL MODELS, HEAT FLUX.

MP 1334

ADSORPTION FORCE THEORY OF FROST HEAVING.

Takagi, S., Cold regions science and technology, May 1980, 3(1), p.57-81, Refs. p.73-76.

35-819

35-819
FROST HEAVE, ADSORPTION, SOIL WATER
MIGRATION, SOIL FREEZING, HEAT TRANSFER, STRESSES, WATER FILMS, THEORIES,
ANALYSIS (MATHEMATICS).

MODELING OF ICE IN RIVERS.

Ashton, G.D., Modeling of rivers. Edited by H.W.
Shen, New York, John Wiley and Sons, 1979, p.14/1-14/26, Refs. p.14/22-14/26.

RIVER ICE, ICE FORMATION, ICE BREAKUP, ICE LOADS, ICE JAMS, FRAZIL ICE, ICE FLOES, MODELS.

MP 1336

SEA ICE ON BOTTOM OF ROSS ICE SHELF. Zotikov, I.A., et al, Antarctic journal of the United States, Oct. 1979, 14(5), p.65-66, 6 refs. Zagorodnov, V.S., Raikovakii, IU.V. 35-652

SEA ICE, ICE STRUCTURE, BOTTOM ICE, ANTARCTICA—ROSS ICE SHELF.

The suthers—RCSS ICES STEERS:
The suthers describe the structure of the ice of Ross Ice
Shelf as it appeared in a J-9 core. Comments are given
on an unusual boundary layer showing in the core and
conclusions and estimates on growth rate are made.

MP 1337

CORE DRILLING THROUGH ROSS ICE SHELF.

Zotikov, I.A., et al, Antarctic journal of the United States, Oct. 1979, 14(5), p.63-64, 2 refs. Zagorodnov, V.S., Ralkovskii, IU.V.

ICE SHELVES, ICE CORING DRILLS, DRILL-

ING, ANTARCTICA—ROSS ICE SHELF.
The ice drill and ice drilling methods and fluids
pull a core from the Ross Ice Shelf are descri
a brief analysis of the core is made.

SUBSURFACE MEASUREMENTS OF MCMUR-DO ICE SHELF.

Gow, A.J., et al, Antarctic journal of the United States, Oct. 1979, 14(5), p.79-80, 2 refs. Kovaca, A.

35-659

ICE CORES, BRINES, ICE COMPOSITION, ANTARCTICA—MCMURDO SOUND.

Study of brine content of sea ice at McMurdo and its physical and chemical relationships to the ice and sea water was continued. Another continuing study concerns radar profiling up glacier from the exposed contact point of sea ice with the ice of Koettlitz Glacier.

MP 1339 DRIFTING BUOY MEASUREMENTS ON WED-DELL SEA PACK ICE.

Ackley, S.F., Antarctic journal of the United States, Oct. 1979, 14(5), p.106-108, 7 refs. 35-676

SEA ICE, DRIFT, TEMPERATURE MEASURE-

The observational techniques of placing the buoys in the Weddell Sea are described, the drift record and the temperature measurement record are shown, and a preliminary assessment and interpretation of the data received is given.

MP 1340

TURBULENT HEAT FLUX FROM ARCTIC LEADS.

Andress, E.L., et al, Boundary-layer meteorology, Aug. 1979, 17(1), p.57-91, 50 refs. Paulson, C.A., Williams, R.M., Lindsay, R.W., Busing-

er, J.A. 35-159 SEA ICE, HEAT TRANSFER, POLYNYAS, TUR-

BULENT EXCHANGE.

MP 1341

PARTICULAR SOLUTIONS TO THE PROBLEM OF HORIZONTAL FLOW OF WATER AND AIR THROUGH POROUS MEDIA NEAR A WET-TING PRONT.

Nakano, Y., Advances in water resources, June 1980, Vol.3, p.81-85, 9 refs.

35-844
POROUS MATERIALS, WATER FLOW, AIR FLOW, BOUNDARY VALUE PROBLEMS, WETTABILITY, SOIL WATER MIGRATION, INFILTRATION, ANALYSIS (MATHEMATICS).

MP 1342

PARTICULAR SOLUTIONS TO THE PROBLEM OF VERTICAL FLOW OF WATER AND AIR THROUGH POROUS MEDIA NEAR A WATER TARLE

Nakano, Y Advances in water resources, Sep. 1980. Vol.3, p.124-133, 12 refs. 35-845

POROUS MATERIALS, ANALYSIS (MATH-EMATICS), WATER FLOW, AIR FLOW, WATER TABLE, BOUNDARY VALUE PROBLEMS, SOIL ATER MIGRATION, INFILTRATION.

THEORY AND NUMERICAL ANALYSIS OF MOVING BOUNDARY PROBLEMS IN THE HYDRO-DYNAMICS OF POROUS MEDIA. Nakano, Y., Water resources research, Feb. 1978, 14(1), p.125-134, 14 refs.

POROUS MATERIALS. HYDRODYNAMICS. BOUNDARY VALUE PROBLEMS, SOIL WATER MIGRATION, WATER FLOW, ANALYSIS (MATHEMATICS), THEORIES.

MP 1344 DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAPROST BENEATH THE BEAUFORT SEA

Sellmann, P.V., et al, Environmental assessment of the Alaskan continental shelf. Vol.2. Principal investigators' reports April-December 1979. Boulder, Colorado, Outer Continental Shelf Environmental Assessment Principal Principal Shelf Environmental Assessment Principal Prin ment Program, March 1980, p.103-110. Chamberlain, E.J.

SUBSEA PERMAFROST, PERMAFROST DISTRI-BUTION, DRILL CORE ANALYSIS, SEISMIC SURVEYS, BOTTOM SEDIMENTS, ENGINEER-ING. MAPPING.

MP 1345

SOVIET CONSTRUCTION UNDER DIFFICULT CLIMATIC CONDITIONS

Assur, A., Soviet housing and urban design. Edited by S.A. Grant. U.S. Dept. of Housing and Urban De-velopment, Sep. 1980, p.47-53.

COLD WEATHER CONSTRUCTION, PERMA-FROST BENEATH STRUCTURES, PREFABRI-CATION, STANDARDS, HOUSES.

MP 1346 PERMAFROST BENEATH THE BEAUFORT SEA: NEAR PRUDHOE BAY, ALASKA.

Selimann, P.V., et al, Journal of energy resources technology, Mar. 1980, 102(1), p.35-48, For the same paper from another source see 33-3864. 34 refs. Chamberlain, B.J.

35-1105 SUBSEA PERMAPROST, OFFSHORE DRILL-ING, PROBES, PENETRATION TESTS, BOTTOM SEDIMENT, OCEAN BOTTOM.

IMPACT FUSE PERFORMANCE IN SNOW (INITIAL EVALUATION OF A NEW TEST

(INITIAL EVALUATION OF A NEW TEST TECHNIQUE).

Aitken, G.W., et al, Army Science Conference, 12th, West Point, N.Y., U.S. Military Academy, June 17-20, 1980. Proceedings, Vol.1, Washington, D.C., Department of the Army, July 21, 1980, p.31-45, ADA-090 350, 8 refs.

Richmond, P.W., Albert, D.G.

SNOW COVER, SNOW LOADS, EXPLOSION EF-FECTS, IMPACT STRENGTH, PROJECTILE PENETRATION, VELOCITY, TESTS.

MP 1348 EVALUATION OF ICE-COVERED WATER CROSSINGS.

Dean, A.M., Jr., Army Science Conference, 12th, West Point, N.Y., U.S. Military Academy, June 17-20, 1980. Proceedings, Vol., Washington, D.C., Department of the Army, July 21, 1980, p.443-453, ADA-090 350, 11 refs.

35-1587
ICE CROSSINGS, ICE COVER STRENGTH, BEARING STRENGTH, FLOATING ICE, ICE COVER THICKNESS, MEASURING INSTRU-

LIQUID DISTRIBUTION AND THE DIELEC-

TRIC CONSTANT OF WET SNOW.

Colbeck, S.C., Workshop on the Microwave Remote Sensing of Snowpack Properties, Fort Collins, Colorado, May 20-22, 1980. Proceedings. Edited by A. Rango. NASA conference publication 2153, Washington, D.C., NASA, Scientific and Technical Information Office, Oct. 1980, p.21-39, 15 refs. 35-1735

35-1735
WET SNOW, DIELECTRIC PROPERTIES, PERMEABILITY LIQUID SOLID INTERFACES, SNOW WATER CONTENT, SNOW BLECTRICAL PROPERTIES, SNOW DENSITY, SNOW BOOKING WATER FOR THE WIND BE OF THE PROPERTIES. COVER STRUCTURE, WATER FLOW, POROSI-TY, ANALYSIS (MATHEMATICS).

TY, ANALYSIS (MATHEMATICS).

The mixing theory of Polder and Van Santen is revised for application to three cases of wet snow. The dielectric constant is calculated for a range of liquid contents and porosities. These calculated values compare favorably with experimental data for the two cases in which data are available. The application to a snow cover with a heterogeneous distribution of liquid is discussed. The possibility of applying this theory to calculate the imaginary part of the dielectric constant must be explored further.

MP 1350

Brown, J., U.S. Army Cold Regions Research and Engineering Laboratory. Report, Sep. 1980, CR 80-19, p.3-52, ADA-094 497.

35-1769
ROADS, CONSTRUCTION, ENVIRONMENTS, PIPELINES, PERMAFROST, CLIMATE, VEGETATION, GEOLOGY, GROUND ICE, UNITED STATES—ALASKA.

MP 1351

ROAD PERFORMANCE AND ASSOCIATED INVESTIGATIONS.

erg, R.L., U.S. Army Cold Regions Research and Engineering Laboratory. Report, Sep. 1980, CR 80-19, p.53-100, ADA-094 497. 35-1770

ROADBEDS, CONSTRUCTION, PERMAFROST BENEATH ROADS, ENGINEERING, SEASON-AL FREEZE THAW, THAW DEPTH, ROAD MAINTENANCE, DRAINAGE, PIPELINES, AC-TIVE LAYER.

MP 1352

DISTRIBUTION AND PROPERTIES OF ROAD DUST ALONG THE NORTHERN PORTION OF

THE HAUL ROAD.

Everett, K.R., U.S. Army Cold Regions Research and Engineering Laboratory. Report, Sep. 1980, CR 80-19, p.101-128, ADA-094 497.

DUST, SEASONAL VARIATIONS, ROADS, TUNDRA, VEGETATION, ENVIRONMENTAL IMPACT, WIND FACTORS.

MP 1353 REVEGETATION AND RESTORATION INVES-

TIGATIONS.

Johnson, L.A., U.S. Army Cold Regions Research and Engineering laboratory. Report, Sep. 1980, CR 80-19, p.129-150, ADA-094 497.

35-1772

REVEGETATION, ROADS, CONSTRUCTION, SOIL EROSION, PIPELINES.

MP 1354

ANALYSIS OF NON-STEADY PLASTIC SHOCK WAVES IN SNOW.

Brown, R.L., Journal of glaciology, 1980, 25(92), p.279-287, 9 refs. 35-1822

SNOW MECHANICS, SHOCK WAVES, WAVE PROPAGATION, AVALANCHE TRIGGERING, EXPLOSION EFFECTS, SNOW DENSITY, PLAS-TIC PROPERTIES, ATTENUATION, PRESSURE, STRESSES.

MP 1355 ARCTIC ECOSYSTEM: THE COASTAL TUNDRA

AT BARROW, ALASKA.

Brown, J., ed, US/IBP synthesis series, No.12, Stroudsburg, Pa., Dowden, Hutchinson and Ross, Inc., 1980, 571p, Refs. p.483-544. For individual chapters see 35-1930 through 35-1941.

Miller, P.C., ed, Tieszen, L.L., ed, Bunnell, F.L., ed. 35-1949.

TUNDRA, ECOSYSTEMS, BIOMASS, NUTRI-ENT CYCLE, SOIL MICROBIOLOGY, ORGANIC SOILS, ANIMALS, CLIMATIC FACTORS, VEGE-TATION, UNITED STATES—ALASKA—BAR-

MP 1356 COASTAL TUNDRA AT BARROW.

Brown, J., et al, Arcti ecosystem: the coasual tundra at Barrow, Alaska. Edited by J. Brown, P.C. Miller, L.L. Tieszen and F.L. Bunnell. Stroudsburg, Pa., Dowden, Hutchinson and Ross., Inc., 1980, p.1-29. Byerett, K.R., Webber, P.J., MacLean, S.F., Jr., Murray, D.F.

TUNDRA, ECOSYSTEMS, ORGANIC SOILS, VEGETATION, CLIMATE, POLYGONAL TOPOGRAPHY, LAKES, ENVIRONMENTS.

MP 1357

ICE FOG SUPPRESSION IN ARCTIC COM-MUNITIES

MUNITHES.

McFadden, T., U.S. Army Cold Regions Research and Engineering Laboratory, SR 80-40, Building under cold climates and on permafrost; collection of papers from a U.S.-Soviet joint seminar, Leningrad, USSR, Dec. 1980, p.54-65, 18 refs. 35-1971

ICE FOG, FOG DISPERSAL, CHEMICAL ICE PREVENTION, VISIBILITY, TEMPERATURE EFFECTS, FILMS, AIR TEMPERATURE.

MP 1358 DESIGN OF FOUNDATIONS IN AREAS OF SIGNIFICANT FROST PENETRATION.

Significant Frost Friedman Significant Frost Friedman Regions Research and Engineering Laboratory, SR 80-40, Building under cold climates and on permafrost; collection of papers from a U.S.-Soviet joint seminar, Leningrad, USSR, Dec. 1980, p.118-184, 48 refs. Lobacz, E.F., Stevens, H.W. 25,1074

35,1975

PERMAPROST BENEATH STRUCTURES, FOUNDATIONS, FREEZE THAW CYCLES, PER-MAFROST HYDROLOGY, PERMAPROST DIS-TRIBUTION, FROZEN GROUND STRENGTH, FROST PENETRATION, SOIL MECHANICS, HEAT TRANSFER, SLOPE PROTECTION, DE-

SIGN

REGULATED SET CONCRETE FOR COLD WEATHER CONSTRUCTION.

Want PHER CONSTRUCTION.
Sayles, F.H., et al, U.S. Army Cold Regions Research and Engineering Laboratory, SR 80-40, Building under cold climates and on permafrost; collection of papers from U.S.-Soviet joint seminar, Leningrad, U.S.R., Dec. 1980, p.291-314, 8 refs.

Houston, B.J. 35-1983

33-1983
COLD WEATHER CONSTRUCTION, WINTER
CONCRETING, CONCRETE STRENGTH, CONCRETE HEATING, COMPRESSIVE PROPERTIES, CEMENTS, CONCRETE CURRING, CONCRETE FREEZING, COUNTERMEASURES,
TEMPERATURE EFFECTS.

MP 1360 EXCAVATION OF FROZEN MATERIALS.

EACAPATION OF FROZEN MATERIALS.

Moore, H.E., et al, U.S. Army Cold Regions Research and Engineering Laboratory, SR 80-40, Building under cold climates and on permafrost; collection of papers from U.S.-Soviet joint seminar, Leningrad USSR, Dec. 1980, p.323-345, 14 refs.

Sayles, F.H. 35, 1064

35-1985

COLD WEATHER CONSTRUCTION, EXCAVA-TION, PROZEN GROUND STRENGTH, EARTH-WORK. CONSTRUCTION EQUIPMENT. MAINTENANCE, COLD WEATHER OPERA-TION, COLD WEATHER SURVIVAL, TEMPERA-TURE EFFECTS, FLOOD CONTROL.

MP 1361

MOISTURE GAIN AND ITS THERMAL CONSE-QUENCE FOR COMMON ROOF INSULA-

Tobiasson, W., et al, Conference on Roofing Technology, 5th April 19-20, 1979, Proceedings, [1980], p.4-16, 19 refs.

Ricard, J.

ROOFS, THERMAL INSULATION, MOISTURE TRANSFER, WETTABILITY, THERMAL CONDUCTIVITY, TESTS.

DUCTIVITY, IRSIS.
This paper describes a method for determining the rate of moisture gain and the decay in thermal resistance caused by moisture in common roof insulations. Information on the rate of moisture gain for various insulations is tabulated (Table III) and graphed (Figures 4 and 5). The rate of moisture gain varies significantly with insulation type and wetting test boundary conditions. Graphs are presented to define the decay in thermal resistance of insulation samples

at increasing moisture contents (Figures 6-11). Moisture significantly reduces the thermal resistance of most roof insulations

MP 1362

MOVAL OF ORGANICS BY OVERLAND MOW

Martel, C.J., et al, Proceedings of the National Seminar on Overland Flow Technology for Municipal Was-tewater, Dallas, Texas, Sep. 16-18, 1980, [1980], 9p., 11 refs.

Bouzoun, J.R., Jenkins, T.F. 35-2052

35-2052
WASTE TREATMENT, WATER TREATMENT, FLOODING, SEDIMENTATION, SEEPAGE, SOIL TEMPERATURE, SOIL CHEMISTRY, SLOPE ORIENTATION, LAND RECLAMA-TION.

MP 1363

WASTE HEAT UTILIZATION THROUGH SOIL PEATING

McFadden, T., et al, Canada. Environmental Protection Service. Beonomic and technical review. Report, Oct. 1980, EPS 3-WP-80-5, Symposium on Utilities Delivery in Northern Regions, 2nd, 1979. Proceedings, p.105-120, 13 refs.

35-2112

WASTE DISPOSAL, HEAT SOURCES, HEAT RECOVERY, SOIL TEMPERATURE, HEATING, COOLING SYSTEMS, AGRICULTURE.

MP 1364 NONSTEADY ICE DRIFT IN THE STRAIT OF BELLE ISLE

Sodhi, D.S., et al, Sea ice processes and models. Edited by R.S. Pritchard, Seattle, University of Washington Press, 1980, p.177-186, 9 refs.
Hibler, W.D., III.

ridier, w.D., iii. 35-2168 SEA ICE, DRIFT, ICE WATER INTERFACE, BOUNDARY LAYER, MATHEMATICAL MOD-ELS, VISCOUS FLOW.

ELS, VISCOUS FLOW.

The finite-element formulation of a linear viscous sea ice model has been presented. The temporal ice acceleration term is included in the momentum equations in order to compute monsteady ice drift rates. This model is applied to the Strait of Belle lale, where strong tidal streams move the pack ice back and forth. Using idealized sinusoidal variations of the tidal streams, it is found that the time lag between the water and the ice velocities is dependent upon the viscosity parameters. These results indicate that the ice is not drifting freely and the boundary layer near the above affects the ice movement in the Strait. The viscosity parameters used in this study are small in order to simulate a reasonable time lag between the ice and water velocities. The high shearing near the above necessitates low viscosities for proper simulation of the flow of pack ice in the Strait. ice in the Strait.

MP 1365

ICEBERG WATER: AN ASSESSMENT. Weeks, W.F., Annals of glaciology, 1980, Vol.1, p.5-10. 27 refs.

ICEBERGS, WATER SUPPLY, ICEBERG TOW-ING.

ING.

This review of the idea of using icebergs as a source of fresh water starts with a historical survey covering the period up to April 1980 and stresses how the approach to the subject has changed with time. Both the progress that have either just surfaced or never been adequately addressed are discussed. It is concluded that successful tows to Australia, clearly the most easily-reached potential delivery site, are possible if icebergs can retain their structural integrity during tows in high seas and if schenes can be developed for docking and processing. Tows to sites in the northern hemisphere such as Saudi Arabia and California are significantly more difficult and will remain so until an effective and operationally-realistic method is developed for isolating the iceberg from the warm sea-water that will be encountered during part of the tow. Whatever the ultimate resolution of the iceberg water proposal may be, research stimulated by this idea has already resulted in a major improvement in our knowledge of the life and time of real icebergs in real oceans. (Auth.) MP 1366

MP 1366 ACOUSTIC EMISSION RESPONSE OF SNOW. St. Lawrence, W.F., Journal of glacology, 1980, 26(94), p.209-216, 10 refs., In English with French and German summaries.

SNOW ACOUSTICS, AVALANCHE TRIGGER-ING, AVALANCHE FORMATION, STRESS STRAIN DIAGRAMS, RHEOLOGY, ULTRA-SONIC TESTS, MATHEMATICAL MODELS.

In this work a model of the ultrasonic acoustic emission response in snow is developed. The model derived considers the acoustic emission response in snow as a function of stress and strain. It is suggested that the acoustic emission activity in snow is a quantitative indication of the creep ruprure taking place in the material. The governing different

tial equation is developed; an example is then present that considers the applicability of this equation to the releas of certain types of avalanche.

MP 1367

PROPAGATION OF STRESS WAVES IN AL-PINE SNOW.

Brown, R.L., Journal of glaciology, 1980, 26(94), p.235-243, 8 refs., In English with French and German summaries. 35-2366

STRESSES, SHOCK WAVES, SNOW DENSITY, WAVE PROPAGATION, SNOW PHYSICS, PRESURE, ANALYSIS (MATHEMATICS), ALPINE LANDSCAPES.

LANDSCAPES.
The propagation of pressure waves in low-density snow is investigated analytically to determine the variation of wave pressure and wave speed with density and frequency. The results abow that, for pressure waves that produce finite volumetric deformations, both pressure jump across the wave and wave-speed increase with initial density and final density. The pressure jump was also found to increase with twave frequency if other parameters were held constant, although the dependence on frequency is not as strong as the dependence on the initial and final densities. The relationship between pressure jump and frequency implies that high-frequency waves would tend to dissipate more quickly than lower-frequency waves, although like pressure, the attenuation rate would not be strongly frequency dependent.

MP 1368
THERMODYNAMICS OF SNOW METAMOR-PHISM DUE TO VARIATIONS IN CURVA-

Colbeck, S.C., Journal of glaciology, 1980, 26(94), p.291-301, 28 refs., In English with French and German sum 35-2372

METAMORPHISM (SNOW), THERMODYNAMICS, SNOW THERMAL PROPERTIES, HEAT TRANSFER, VAPOR DIFFUSION, TEMPERATURE GRADIENTS, ANALYSIS (MATHEMATICS), WET SNOW.

Ito), when the base of imposed temperature gradients, the metamorphism of dry snow is dominated by the alow process of vapor diffusion between surfaces of different radii of curvature. remain or any season is commission by the slow process of open different radii of curvature. This process is so slow in a seasonal snow cover (where temperatures normally change on the scale of hours or days) that vapor migration is usually dominated by the imposed temperature gradient. Thus radius of curvature contributes to but does not control metamorphism except for short periods in very fresh snow. As opposed to dry anow, liquid-esturated anow (i.e. pore space filled by the melt) is metamorphosed by heat flow arising from relatively large temperature differences among the particles. Grain growth in liquid-esturated snow is rapid because of the large temperature differences at nearly constant liquid pressure. In wet snow with low liquid content (2-5% by volume), grain growth is much slower than under conditions of liquid saturation.

MP 1369

MF 1369' MF OCEANIC BOUNDARY-LAYER CHARACTERISTICS INCLUDING INERTIAL OSCILLATION AT THREE DRIFTING STATIONS IN THE ARCTIC OCEAN.

McPhee, M.G., Journal of physical oceanography, June 1980, 10(6), p.870-884, 22 refs. 35.1059.

35-1050

DOUNDARY LAYER, DRIFT, PACK ICE, OCEAN CURRENTS, OSCILLATIONS, WIND FACTORS, DRIFT STATIONS.

MP 1370 CONSTITUTIVE RELATION FOR THE DEPOR-

CONSTITUTE RELATION FOR THE DEFORMATION OF SNOW.

St. Lawrence, W.F., et al, Cold regions science and technology, Jan. 1981, 4(1), p.3-14, 16 refs.

Lang, T.B.

35-2414

SNOW DEFORMATION, SNOW COVER STRUC TURE, STRESS STRAIN DIAGRAMS, SNOW COMPRESSION, VELOCITY, SNOW ACOUSTICS, ANALYSIS (MATHEMATICS).

TICS, ANALYSIS (MATHEMATICS). In this paper a constitutive equation which describes the miazial deformation of snow is developed. The basic assumption underlying this work is that the streat-atrain response can be derived by considering the structure of the material. The equation which describes the plastic portion of the deformation is developed by considering the relationship between three fundamental variables: the mean specing between ice grains, the relatative velocity between rains, sad the fraction of the total number of grains which participate in the deformation process. The mean distance between ice grains is determined by a stereological investigation of the snow structure, and the velocity component is found by empirically characterizing the relatation of the snow. To determine the mobility of the ice grains acoustic emissions for constant rates of deformation is derived and applied to a number of tests. Combining the above variables produces a compressive and tensile constitutive

equation which reflects the behavior of the snow under both uniaxial deformations.

CYCLIC LOADING AND FATIGUE IN ICE. Mellor, M., et al, Cold regions science and technology, Jan. 1981, 4(1), p.41-53, 4 refs. Cole, D.M.

35-2417

ICE CRYSTALS, DYNAMIC LOADS, ICE STRENGTH, STRESS STRAIN DIAGRAMS, FATIGUE (MATERIALS), ICE CREEP, TIME

FACTOR.

Isotropic polycrystalline ice was subjected to cyclic loading in uniaxial compression at -5C, with stress limits 0-2 and 0-3 MPa, and frequencies in the range 0.043 to 0.5 Hz. Stress-strain eccords showed hysteresis loops progressing along the strain axis at non-uniform rates. The effective secant modulus, which was about half the true Young's modulus, decreased during the course of a test. The elastic strain amplitude and the energy dissipated during a loading cycle both increased with increase of time and plastic strain. Strain-time records gave mean curves which were identical in form to classical constant stress creep curves, with a small cyclic alternation of recoverable strain about the mean curve. The results of the tests suggest that maximum resistance under compressive cyclic loading occurs at an axial plastic strain for ductile yielding under constant same as the failure strain for ductile yielding under constant stress and under constant strain-rate.

MP 1372 COLD REGIONS SCIENCE AND TECHNOLO-

GY BIBLIOGRAPHY.
Cumminss, N.H., Cold regions science and technology, Jan. 1981, 4(1), p.73-75.
35-2420

BIBLIOGRAPHIES, GLACIOLOGY, PERMA-FROST, HYDROLOGY, ENGINEERING GEOLOGY, METEOROLOGY.

MP 1373
COLD CLIMATE UTILITIES DELIVERY DE-SIGN MANUAL.

Smith, D.W., et al, Canada. Environmental Protection Service. Report, 1979, EPS 3-WP-79-2, c300 leaves, Numerous refs. passim.

Reed, S.C.

33-4406
MANUALS, UTILITIES, NATURAL RE-SOURCES, WATER SUPPLY, WASTE DISPOSAL, WATER TREATMENT, WATER PIPELINES, PIPELINE FREEZING, THERMAL INSULA-

MP 1374
PROCEEDINGS 1972 TUNDRA BIOME SYM-POSIUM.

International Biological Programme. Tundra Biome, 1972, 211p., For selected papers see 31-2031 through 31-2049. Symposium held at Lake Wilderness Center, University of Washington 3-5 April, 1972. Brown, J., coord, Bowen, S., ed. 31-2030

TUNDRA VEGETATION, TUNDRA SOILS, SOIL CHEMISTRY, DECOMPOSITION.

MP 1375 CO2 EXCHANGE IN THE ALASKAN ARCTIC TUNDRA: METEOROLOGICAL ASSESSMENT BY THE AERODYNAMIC METHOD.

Coyne, P.I., et al. 1972 Tundra Biome Symposium, Lake Wilderness Center, Univ. of Washington, July 1972. Proceedings, 1972, p.36-39, 4 refs. Kelley, J.J. 31-2036

TUNDRA VEGETATION, TURBULENT EX-CHANGE, CARBON DIOXIDE.

MP 13/6 COMPARATIVE INVESTIGATION OF PERI-ODIC TRENDS IN CARBOHYDRATE AND LIPID LEVELS IN ARCTIC AND ALPINE PLANTS.

McCown, B.H., et al, 1972 Tundra Biome Symposium, Lake Wilderness Center, Univ. of Washington, July 1972. Proceedings, 1972, p.40-45, 3 refs.

Tieszen, L.L. 31-2037

ARCTIC LANDSCAPES, CELL MORPHOLOGY, LIPIDS, CARBOHYDRATES.

MP 1377

DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAFROST BENEATH THE

TEMISTICS OF PERMAPROST BENEATH THE BEAUFORT SEA.
Sellmann, P.V., et al, Environmental assessment of the Alsakan continental shelf. Vol. 12. Geology. Principal investigators' reports for the year ending March 1976, Boulder, Colorado, Environmental Research Laboratories, 1976, p.391-408, Includes preliminary bibliography of Soviet literature on subsea permafrost, 404-405.

p.404-408. Berg, R.L., Brown, J., Blouin, S.E., Chamberlain, E.J., Iskandar, A., Ueda, H.T.

31-361

PRESEARCH PROJECTS, OFFSHORE DRILLING, SUBSEA PERMAFROST, BEAUFORT SEA.

MP 1378 ANTARCTIC SEA ICE DYNAMICS AND ITS POSSIBLE CLIMATIC EFFECTS.

Ackley, S.F., et al, Arctic Ice Dynamics Joint Experiment. AIDJEX bulletin, Sep. 1976, No.33, p.53-76, 20 refs.

Keliher, T.E.

31-448 SEA ICE, ICE COVER EFFECT, CLIMATE, SPACEBORNE PHOTOGRAPHY, PHOTOIN-TERPRETATION, HEAT LOSS, MICROWAVES. SPACEBORNE PHOLOGRAPHY, PHOTOINTERPRETATION, HEAT LOSS, MICROWAVES.
Ice extent charts prepared from satellite images by the U.S.
Naval Fleet Weather Facility and passive microwave emission
data from the Nimbus V satellite were examined for the
winters of 1973 and 1974 to determine the variation between
the two years of the heat loss by the atmosphere because
of variations in sea ice extent and concentration. The
microwave data indicate that most of the area within the
ice edge is less than 80% ice covered even during the
coldest part of the year, probably because of ocean currents,
waves, and swell, and convergence and divergence in the
atmospheric forcing fields. Since the winter heat and
moisture transports from open water are about two orders
of magnitude larger than from an equal area of sea ice,
even small areas of open water within the ice edge can
greatly affect the energy exchange. These new data are
compared with the assumption of 100% ice cover within
the ice edge and with previously assumed mean values for
the total area covered by ice in calculating the heat lost
by the atmosphere during the winter period in high southern
latitudes. A rapid decrease in sea ice extent observed
during the winter of 1973 is correlated with a nearly realtime adjustment by the atmosphere to the change in the
heat loss caused by the removal of the ice. This example
indicates that sea ice dynamics is influential not only in
long-term climate, but in synoptic-scale weather patterns
as well.

MP 1376

MP 1379 MISGIVINGS ON ISOSTATIC IMBALANCE AS A MECHANISM FOR SEA ICE CRACKING.

Ackley, S.F., et al, Arctic Ice Dynamics Joint Experi-ment. AIDJEX bulletin, Sep. 1976, No.33, p.85-94, 12 refs.

Hibler, W.D., III, Kugzruk, F.K.

31-450 SEA ICE, ICE CRACKS, ISOSTASY, ICE PHY-SICS, ICE DENSITY.

In the AIDJEX ice pack model the formation mechanisms for ice cracks are ignored because of the many processes by which cracks may form. The authors question this concept and particularly the mechanism of isostatic imbalance. They cite the Young's modulus used in the AIDJEX model as being not representative of sea ice and that beam experiments in static tests lead them to question the validity of a purely elastic analysis.

MP 1380 DYNAMICS OF NEAR-SHORE ICE.

eeks, W.F., et al, Environmental assessment of the Alaskan continental shelf; Vol. 14, Ice. Principal Investigators' reports for the year ending March 1976, Boulder, Colorado, Environmental Research Laboratories, 1976, p.9-34, 16 refs. Includes appen-dix No. 1 by A. Kovacs and A.J. Gow, Some characteristics of grounded floebergs near Prudhoe Bay, Alaska. Kovaca, A., Gow, A.J.

731-628
7-83T ICB, ICB MECHANICS, ICE FLOES, ICB ISLANDS, SEA ICB, DRIFT, RADAR ECHOES, BOTTOM ICE, ICBBERGS, BOTTOM TOPOGRAPHY, UNITED STATES-ALASKA—PRUDHOE BAY

MP 1381 INVESTIGATION OF ICE ISLANDS IN BAB-BAGE BIGHT.

Kovaca, A., et al. Creare, Inc. Technical note 118, Hanover, New Hampshire, Creare, Inc., 1971, 46 leaves, 24 refs.

Mellor, M.

31-820, 31-820 SEA ICE, ICE ISLANDS, ICE STRUCTURE, SUB-GLACIAL OBSERVATIONS, ICE DENSITY, GROUNDED ICE.

MP 1382 RHEOLOGICAL IMPLICATIONS OF THE IN-TERNAL STRUCTURE AND CRYSTAL FAB-RICS OF THE WEST ANTARCTIC ICE SHEET AS REVEALED BY DEEP CORE DRILLING AT BYRD STATION.

Gow, A.J., et al, Geological Society of America. Bulletin, Dec. 1976, 87(12), p.1665-1677, 51 refs. Williamson, T.

31-1071

ICE SHEETS, ICE CRYSTAL STRUCTURE, RHEOLOGY, ICE DEFORMATION, ANTARCTICA—BYRD STATION.

Crystalline textures and fabrics of ice cores from the 2,164-m-thick ice sheet at Byrd Station, reveal the existence of an anisotropic ice sheet. A gradual but persistent increase in the c-axis preferred orientation of the ice crystals was an anisotropic ice sheet. A gradual but persistent increase in the c-axis preferred orientation of the ice crystals as observed between the surface and a depth of 1,200 m. This progressive growth of an oriented crystal fabric is accompanied by a twentyfold increase in crystal size between 56 and 500 m, followed by virtually no change in crystal size between 600 and 1,200 m depth. A broad vertical clustering of c axes develops by 1,200 m. Between 1,200 and 1,300 m, the structure transforms into a fine-grained messaic of crystals with their basal gide planes now oriented substantially within the horizontal. This highly oriented fine-grained structure, which persists to 1,800 m depth, is compatible only with a strong horizontal shear deformation in this part of the ice sheet. Rapid transformation from single- to multiple-maximum fabrics occurs below 1,800 m. This transformation, accompanied also by the growth of very large crystals, is attributed to the overriding effect of relatively high temperatures in the bottom layers of old cet Byrd Station rather than to a significant decrease in stress. The zone of single-maximum fabrics between 1,200 and 1,800 m also contains numerous layers of volcanic dust which appear to be actively associated with shearing in the ice sheet. Some slipping of ice along the botton structures and fabrics of the ice indicate that plastic deformation (intracrystalline gide) in the zone of strong single-maximum fabrics and movement of ice along discrete shear planes situated well above bed rock are also major contributors to the flow of the ice sheet. (Auth. mod.)

MP 1383
ECOLOGICAL AND ENVIRONMENTAL
CONSEQUENCES OF OFF-ROAD TRAFFIC IN
NORTHERN REGIONS.

Brown, J., Surface Protection Seminar, Anchorage, Alaska, Jan. 19-22, 1976. Proceedings. Edited by M.N. Evans, Anchorage, Alaska, Bureau of Land Management, Aug. 1976, p.40-53, 19 refs.

31-1088
PERMAFROST PRESERVATION, ARCTIC LANDSCAPES, TUNDRA, ALL TERRAIN VEHICLES, PROTECTION, ENVIRONMENTAL IMPACT, REVEGETATION, HUMAN FACTORS, THAW DEPTH, SOIL TRAPPICABILITY, VEGETATION, PROSERVED TO THE PROPERTY OF T TATION PROTECTION, DAMAGE, GROUND THAWING.

The consequences of off-road activities depend on when the activity occurs (summer vs. winter), the degree of impact, the nature and response of the underlying permafrost to the surface modification, and the rate at which the damaged environment will recover. Regulations based on a knowledge of the environmental variables and how they reset to impact are required to minimize impact in these areas which are sensitive to human and natural perturbations. We should not underestimate the requirement for good environmental information and adequate resource mapping as first, necessary

VEHICLE FOR THE FUTURE.

VEHICLE FOR THE FOLURE.
Slaughter, C.W., Surface Protection Seminar, Anchorage, Alaska, Jan. 19-22, 1976. Proceedings. Edited by M.N. Evana, Anchorage, Alaska, Bureau of Land Management, Aug. 1976, p.272-279, 5 refs. 31-1111

AIR CUSHION VEHICLES, ARCTIC LAND-SCAPES, DAMAGE, ENVIRONMENTAL IM-PACT, GROUND THAWING.

PACT, GROUND THAWING.

The U.S. Army Cold Regions Research and Engineering Laboratory (USACRREL) has evaluated effects of sir-cushion nehicles (ACV's) on surfaces on Alsaka's Arctic Stope. Most ACV surface impact was from sbrasion by the vehicle skirts rather than air flow, which merely removed loose litter. Vehicle speed and surface micro-relief both affected surface damage. The ACV damaged the surface less than other vehicles tested and caused less accelerated soil thaw; trails over which the ACV passed recovered faster. Size, payload, cost, terrain characteristics, and availability are among the conditions that determine the kind of vehicle needed for particular job. No single vehicle, now or in the future, can fill all the necessary and desirable requirements and cause little surface damage. Other aspects of off-road travel, such as route selection, trail improvement and protection, operator sensitivity, and access priorities also affect surface damage. More important than vehicle design and selection are the management decisions to be made concerning regulation of off-road travel.

MP 1385 CHEMISTRY OF INTERSTITIAL WATER FROM SUBSEA PERMAFROST, PRUDHOE BAY, ALASKA.

lakandar, I.K., et al, International Conference on Permafrost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Research Council of Canada, 1978, p.92-98, With Russian and French summaries. 20 refs. Osterkamp, T.E., Harrison, W.D. 32-3676.

32-3676

WATER CHEMISTRY, SUBSEA PERMAPROST, INTERSTITIAL WATER.

MP 1386 ANTARCTIC SOIL STUDIES USING A SCAN-NING ELECTRON MICROSCOPE.

Kumai, M., et al, International Conference on Perma numa, M., et al, international Conference on Perma-frost, 3rd, Edmonton, Alberta, Canada, July 10-13, 1978. Proceedings. Vol.1, Ottawa, National Re-search Council of Canada, 1978, p.106-112, With Rus-sian and French summaries. 12 refs. Anderson, D.M., Ugolini, F.C. 32,3678

SUBJECTION MICROSCOPY, CRYOGENIC SOILS, MORAINES, SOIL COMPOSITION, GRAIN SIZE, WEATHERING, ANTARCTICA—VICTORIA LAND.

The textures of morainic soils from southern Victoria Land were investigated, using a scanning electron microscope fitted with an energy dispersive X-ray analyzer. Electron micrographs of soil grains from lower Wright Valley showed sharp edges and smooth surfaces, indicating a low degree of mechanical and chemical weathering. The soil grains were 11% quartz and 4% magnetite. Chlorides were found on 7% cal and chemical weathering. The soil grains were 11% of the soil grains. By contrast, electron micrographs of soil grains from the Beacon Valley showed rounded grains indicating a high degree of mechanical and chemical weathering. The soil grains were 20% quartz. Rhombobedral crystals CaSO4 were found on 60% of the soil grains. Chlorides were found on 30% of the soil grains. Because of the high degree of weathering, it was concluded that the morainic soils from the Beacon Valley are much older than those of the lower Wright Valley.

COST OF LAND TREATMENT SYSTEMS.

Reed, S.C., et al, U.S. Environmental Protection Agency. Technical report, Sep. 1979, EPA-430/9-Agency. Technical report, Sep. 1979, 75-003, 135p., 45 refs. Crites, R.W., Thomas, R.E., Hais, A.B. 35-2464

SEEPAGE, WASTE TREATMENT, SEWAGE TREATMENT, WATER TREATMENT, COST ANALYSIS, FLOW RATE, SURFACE DRAIN-AGE, LAND RECLAMATION.

Cost information for planning is presented for the major land treatment concepts including slow rate, rapid infiltration and overland flow. Cost categories include land, preapplication treatment, transmission, storage, land application, and recovery of renovated water.

MP 1388

MEASURING BUILDING R-VALUES FOR LARGE AREAS.
Flanders, S.N., et al, Society of Photo-Optical Instrumentation Engineers. Proceedings, 1981, Vol.254, p.137-138.
Marshall, S.J.
35,2463

35-2463

BUILDINGS, WALLS, THERMAL REGIME, HEAT FLUX, SURFACE TEMPERATURE, TEMPERATURE MEASUREMENT.

A method is being developed for measuring the R-values of large areas of building envelopes. This is a summary of progress to date. Temperature extremes on the building surface are located with an infrared videocamera, the R-values at those locations determined with contact thermal sensors and R-values interpolated for all other locations from

MP 1389 HEALTH ASPECTS OF LAND TREATMENT.

Reed, S.C., Cincinnati, Oh., U.S. Environmental Protection Agency, 1979, 43p., Prepared for Seminar on Land Treatment of Municipal Wastewater Effluents, June 1979. 52 refs.

WASTE TREATMENT, POLLUTION, HEALTH, WATER TREATMENT, LAND RESTORATION.

HAND-HELD INFRARED SYSTEMS FOR DE-TECTING ROOF MOISTURE.

TECTING ROOF MOISTURE.

Tobiasson, W., et al, Symposium on Roofing Technology, Gaithersburg, Md., Sep. 21-23, 1977. Proceedings, [1977], p.261-271, 4 refs.

Korbonen, C., Van den Berg, A.

35-2494

MOOPS, MOISTURE DETECTION, MOISTURE METERS, INFRARED RECONNAISSANCE, THERMAL INSULATION.

MP 1391 LANDSAT DIGITAL ANALYSIS OF THE INI-TIAL RECOVERY OF BURNED TUNDRA AT ROKOLIK RIVER, ALASKA.

Hall, D.K., et al, Remote sensing of environment, 1980, No.10, p.263-272, 8 refs.
Ormsby, J.P., Johnson, L.A., Brown, J. 35-2462

TUNDRA, FIRES, ENVIRONMENTAL IMPACT. REMOTE SENSING, ANALYSIS (MATHEMATICS), LANDSAT, REVEGETATION.

MP 1392

MP 1390

LAND DESPOSAL: STATE OF THE ART. Reed, S.C., National Symposium on Ultimate Disposal of Wastewaters and Their Residuals, Durham, N.C., April 26-27, 1973. Proceedings. Edited by F.E. McJunkin and P.A. Vesilind, Raleigh, North Carolina State University, 1973, p.229-261, 42 refs.

35-2469
WASTE DISPOSAL, WATER TREATMENT, ENVIRONMENTAL PROTECTION, SEEPAGE, CLIMATIC FACTORS, FLOW RATE, VEGETATION,
AEROSOLS, HEALTH.

MP 1393

WINDOW PERFORMANCE IN EXTREME

Flanders, S.N., et al, Specialty Conference on the Northern Community, Seattle, Wa., Apr. 8-10, 1981. Proceedings. Edited by T.S. Vinson, New York, American Society of Civil Engineers, 1981, p.396-408, 2 refs.

Buska, J., Barrett, S.

WINDOWS, COLD WEATHER CONSTRUC-TION, WEATHERPROOFING, MOISTURE, CLI-MATIC FACTORS, COUNTERMEASURES.

MATIC FACTORS, COUNTERMEASURES.

Extreme cold causes heavy buildup of frost, ice and condensation on many windows. It also increases the incentive for improving the sirtightness of windows in Alaska to avoid moisture accumulation in homes and barnacis. We base our conclusions on a two-year study of Alaskan military bases that included recording humidity and temperature data, observing moisture accumulation on windows and measuring airtightness with a fan pressurization device. Our study shows that tightening Alaskan windows to permit only 30% of the air leakage allowed to current American standards for window airtightness is economically attractive.

MATI 1204.

AQUACULTURE FOR WASTEWATER TREAT-MENT IN COLD CLIMATES.

Reed, S.C., et al, Specialty Conference on the Northern Community, Seattle, Wa., Apr. 8-10, 1981. Proceedings. Edited by T.S. Vinson, New York, American Society of Civil Engineers, 1981, p.482-492, 12 refa.

Bouzoun, J.R. 35-2519

WASTE TREATMENT, WATER TREATMENT, PLANTS (BOTANY).

PLANTS (BOTANY).

Aquaculture systems for wastewater treatment often include plants, finned fish, animals and microorganisms in various combinations in aquatic settings such as ponds, marshes, bogs and other forms of wetlands. Natural settings have often been used in the past but there is a trend toward constructed systems which permit more reliable management at higher rates of treatment. This paper evaluates the potential for application of aquaculture concepts for wastewater treatment in cold climates. Constructed wetlands and the enclosed high rate processes offer the most promise of the concepts considered. Systems based on plants are more efficient, require less area and are easier to control than concepts involving higher forms of animals.

MP 1395 WINTER AIR POLLUTION AT FAIRBANKS, ALASKA.

Coutts, H.J., et al, Specialty Conference on the Northern Community, Seattle, Wa., Apr. 8-10, 1981. Proceedings. Edited by T.S. Vinson, New York, American Society of Civil Engineers, 1981, p.512-528, 16 refs.

Jenkins, T.F. 35-2522

AIR POLLUTION, CHEMICAL ANALYSIS, EN-VIRONMENTAL IMPACT, MOTOR VEHICLES, HUMAN FACTORS, STANDARDS.

Air quality measurements were made for both gases and particulates at several locations near Pairbanks, Alaaka, during winter. The results indicated that carbon monoxide levels downtown frequently exceeded air quality standards and were significantly elevated at more rural locations up to 22 km from the downtown area. High levels were found to be associated with temperature inversions. Nitric oxide levels were measured and found to range from less than 50 to over 500 parts per billion (ppb) downtown. Levels of 1 to 68 ppb were measured in a more rural location. The major source of both CO and NO at Fairbanks was found to be auto exhaust. Levels of particulate lead in the downtown area were found to exceed Federal Standard for all 4 winter months. Lead levels at the more rural site were only about one-tenth those of downtown and did not exceed standards. not exceed standards

MP 1396 ICE FORCE MEASUREMENT ON THE YUKON RIVER BRIDGE.

McPadden, T., et al, Specialty Conference on the Northern Community, Seattle, Wa., Apr. 8-10, 1981. Proceedings. Edited by T.S. Vinson, New York, American Society of Civil Engineers, 1981, p.749-777,

Haynes, D., Burdick, J., Zarling, J. 35-2536

ICE BREAKUP, ICE PRESSURE, ICE LOADS, IM-PACT STRENGTH, BRIDGES, ICE COVER STRENGTH, LOADS (FORCES), ICE COVER THICKNESS, RADAR ECHOES.

THICKNESS, RADAR ECHOES.

The Alaskan Projects Office of Cold Regions Research and Engineering Laboratory has been studying the forces imposed on the Yukon River bridge by ice during breakup. The study involved four consecutive breakups from 1977 thru 1980. Forces have been measured using load cells mounted on the front of the number 5 pier to intercept the ice is it strikes the pier. Accelerometers mounted on piern number 4 and 5 were used to measure the response of the pier to the ice impacts. Calibration procedures were employed to determine a transfer function which relates the accelerations to the applied forces. Ice thicknesses were measured using short pulse radar techniques. River ice damaged or destroyed the first generation load cell designs, but some useful dats was obtained before failure. Radar techniques show some promise for the measurement of ice techniques show some promise for the measurement of ice thicknesses during breakup.

MP 1397 ANALYSIS OF VELOCITY PROFILES UNDER ICE IN SHALLOW STREAMS.

Calkina, D.J., et al, Workshop on Hydraulic Resistance of River Ice, Burlington, Ontario, Sep. 23-24, 1980. Proceedings. Edited by G. Tsang and S. Beltaos, Burlington, Ontario, National Water Research Institute, 1981, p.94-111, 6 refs.
Deck, D.S., Martinson, C.R.

35-2545

STREAM FLOW, ICE COVER EFFECT, FLOW RATE, SHEAR STRESS, SURFACE ROUGH-NESS, ICE BOTTOM SURFACE, PROFILES.

HARNESSING FRAZIL ICE.

PEARINESSING FRAZIL ICE.

Perham, R.E., Workshop on Hydraulic Resistance of River Ice, Burlington, Ontario, Sep. 23-24, 1980.

Proceedings. Edited by G. Tsang and S. Beltaos. Burlington, Ontario, National Water Research Institute, 1981, p.227-237.

35-2554

FRAZIL ICE, ICE CONTROL, RIVER ICE, RIVER FLOW, FLOW RATE, HYDRODYNAMICS, ICE FORMATION.

FORMATION.

The techniques for analyzing velocity profiles should be carefully considered in shallow streams where the flow depth is less than 1 m. The two procedures, a) mean and maximum velocity determinations and b) intercept evaluation of log (depth)-velocity plots, yield different results for the various resistance coefficients and shear stress values. The mean-max-velocity method generally predicts higher values than the other and is recommended for shallow streams. The minimum distance from a boundary to the position of maximum velocity for a good velocity profile appears to be roughly 15 to 20 cm with a 5 cm diameter sensor.

MP 1399 LAND TREATMENT OF WASTEWATERS FOR RURAL COMMUNITIES.

ROWAL COMMONITIES.
Reed, S.C., et al, Rural Environmental Engineering
Conference, Warren Vt., Sept. 26-28, 1973. Proceedings. Water pollution control in low density areas.
Edited by W.J. Jewell, Hanover, N.H., University
Press of New England, 1975, p.23-39, 7 refs. Buzzell, T.D.

35-2568

WASTE TREATMENT, WATER POLLUTION, SEEPAGE, SURFACE DRAINAGE, IRRIGATION, DESIGN CRITERIA, COST ANALYSIS. SEEPAGE

MP 1400 RATIONAL DESIGN OF OVERLAND FLOW

SYSTEMS.

Martel, C.J., et al., National Conference on Environmental Engineering, New York, July 8-10, 1980.

Proceedings, New York, American Society of Civil Engineers, 1980, p.114-121, 9 refa.

Adrian, D.D., Jenkins, T.F., Peters, R.E.

WASTE TREATMENT, WATER TREATMENT, FLOODING, HYDRAULICS, GRASSES, SLOPES, RUNOFF, SEEPAGE, TIME FACTOR, DESIGN.

MP 1401 ENERGY AND COSTS FOR AGRICULTURAL REUSE OF WASTEWATER.

Sletten, R.S., et al, National Conference on Environmental Engineering, New York, July 8-10, 1980. Proceedings, New York, American Society of Civil Engineers, 1980, p. 1939-346, 9 refs. Reed, S.C., Middlebrooks. E.J.

WATER TREATMENT, WASTE TREATMENT, LAND RECLAMATION, SEEPAGE, AGRICUL-TURE, FLOODING, SANITARY ENGINEER-ING, COST ANALYSIS.

MP 1402 FORAGE GRASS GROWTH ON OVERLAND FLOW SYSTEMS.

Palazzo, A.J., et al, National Conference on Environramazzo, A.J., et al, National Conference on Environ-mental Engineering, New York, July 8-10, 1980. Proceedings, New York, American Society of Civil Engineers, 1980, p.347-354, 16 refs. Martel, C.J., Jenkins, T.F.

WASTE TREATMENT, WATER TREATMENT, FLOODING, IRRIGATION, GRASSES, CHEMICAL COMPOSITION, LAND RECLAMATION, SLOPES, SANITARY ENGINEERING.

SPRAY APPLICATION OF WASTEWATER EF-FLUENT IN A COLD CLIMATE: PERFORM-ANCE EVALUATION OF A FULL-SCALE PLANT.

Cassell, E.A., et al, National Conference on Environ-mental Engineering, New York, July 8-10, 1980. Proceedings, New York, American Society of Civil Engineers, 1980, p.620-626, 7 reft. Meals, D.W., Bouzoun, J.R., Martel, C.J., Bronson,

W.A. 35-2574 WASTE TREATMENT, WATER TREATMENT, CHEMICAL COMPOSITION, LAND RECLAMA-TION, COLD WEATHER PERFORMANCE, HY-DROLOGY, SEASONAL VARIATIONS.

MP 1404 HEALTH ASPECTS OF WATER REUSE IN CALIFORNIA.

Reed, S.C., American Society of Civil Engineers. Environmental Engineering Division. Journal, Apr. 1979, 105(EE2), p.434-435, Discussion of a paper by J. Crook, Ibid., Aug. 1978, Proc. paper No. 13928. 35-2580

WASTE TREATMENT, WATER TREATMENT, WATER POLLUTION, BACTERIA, HEALTH, AEROSOLS, LAND RECLAMATION.

TUNDRA AND ANALOGOUS SOILS.

Bverett, K.R., et al, Tundra ecosystems: a comparative analysis. Edited by L.C. Bliss, et al. International Biological Programme 25, Cambridge University, 1981, p.139-179, Refs. p.176-179.
Vasil'eveksia, V.D., Brown, J., Walker, B.D.

35-2705

TUNDRA, SOIL FORMATION, GEOMOR-PHOLOGY, PERMAFROST, SEASONAL FREEZE THAW, VEGETATION, CLIMATIC FACTORS, ECOSYSTEMS, SOIL COMPOSITION, SOUTH SHETLAND ISLANDS, MACQUARIE IS-LAND, SOUTH GEORGIA.

Properties of Arctic, sub-Arctic, sub-Antarctic, mountain and maritime tundra soils are described. Climate, seasonal freeze thaw regime of tundra soils, soil composition, geomorphology and vegetation are discussed. Data on soil profiles for the South Shetland Is., Macquarie I. and South Georgia

MUNICIPAL SLUDGE MANAGEMENT: ENVI-RONMENTAL FACTORS.

Reed, S.C., ed, U.S. Environmental Protection Agency. Office of Water Program Operations. Technical bulletin, Oct. 1977, BPA 430/9-77-004, Var. p., 6 refs.

35-2715
SLUDGES, WASTE DISPOSAL, WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, ENVIRONMENTAL PROTECTION,
BACTERIA, LEGISLATION, AGRICULTURE.

USE OF PILING IN FROZEN GROUND.

USE OF PHLING IN FROZEN GROUND, Croty, F.E., American Society of Civil Ragineers. National Convention, Session No.3, Portland, Oregon, Apr. 14-18, 1980. Cold regions engineering, Portland, Oregon, 1980, 21 p., 24 refs. 35-2711

35-2711
PILE DRIVING, FOUNDATIONS, FROZEN
GROUND STRENGTH, COLD WEATHER CONSTRUCTION, PERMAPROST DEPTH, PILE
LOAD TESTS, BEARING STRENGTH, FROST
HEAVE, HEAT TRANSFER.

MP 1409

ROOFS IN COLD REGIONS.

ACOURS IN COLD REGIONS.
Tobiasson, W., American Society of Civil Engineers.
National Convention, Session No.3, Portland, Oregon,
Apr. 14-18, 1980. Cold regions engineering, Portland, Oregon, 1980, 21p., 10 refs.
35-2713

35-2/13
ROOPS, WATERPROOFING, COLD WEATHER CONSTRUCTION, INSULATION, MOISTURE, CLIMATIC FACTORS.

ANALYSIS OF WATER IN THE MARTIAN

REGOLITH.
Anderson, D.M., et al. Journal of molecular evolution, 1979, Vol.14, p.33-38, 9 refs.

A.R.

MARS (PLANET), SOIL WATER, ADSORPTION, WATER VAPOR, THERMODYNAMICS, SOIL MICROBIOLOGY, TEMPERATURE EFFECTS.

MICROBIOLOGY, TEMPERATURE EFFECTS.
One of the scientific objectives of the Viking Mission to Mars was to accomptish an analysis of water in the Martian regolith. The analytical scheme originally suvisioned was severely compromised in the latter stages of the Lander instrument package design. The presence of a duricrust at one of the Lander sites is taken as possible evidence for the presence of hygroscopic minerals on Mars. The demonstrated presence of atmospheric water vapor and thermodynamic calculations lead to the belief that adsorbed water could provide a relatively favorable environment for endolithic organisms on Mars similar to types recently discovered in the dry antarctic deserts.

MP 1410 ESTIMATION OF HEAT AND MASS FLUXES OVER ARCTIC LEADS.

Andreas, E.L., Monthly weather review, Dec. 1980, 108(12), p.2057-2063, 26 refs.

POLYNYAS, SEA ICE, HEAT TRANSFER, MASS TRANSFER, TURBULENT EXCHANGE, HEAT FLUX, ANALYSIS (MATHEMATICS).

PLUX, ANALYSIS (MATHEMATICS).

Recent work on the turbulent transfer of scalar quantities following a step increase in the surface value of the scalar is directly applicable to the problem of estimating heat and mass transfer from Arctic leads in winter. With the transfer relations, turbulent fluxes can be computed from standard meteorological observables; and from the Nusselt number equality, partitioning of the turbulent fluxes can be evaluated—in particular, the partitioning of the heat flux between sensible and latent components.

ACD 1411

MP 1411 PILES IN PERMAFROST FOR BRIDGE FOUN-DATIONS.

DATIONS.

Crory, F.E., et al, ASCE Structural Engineering Conference, Seattle, Washington, May 8-12, 1967.

Conference preprint 522, [1967], 41p., 6 refs.

Matlock, C.S.

35-2753

PERMAPROST BENEATH RIVERS, PILE DRIV-ING, FOUNDATIONS, BRIDGES, PERMA-FROST PRESERVATION, BEARING STRENGTH, SETTLEMENT (STRUCTURAL), SOIL TEMPERATURE, DESIGN CRITERIA, FROST HEAVE, COUNTERMEASURES, STREAMS.

This cooperative research study has focused considerable attention on the ground temperatures existing beneath and adjacent to streams in permafrost areas. An appreciation of the changes in the thaw area beneath the stream, both at the time of construction and for the life of the structure, is essential to proper siting of the bridge foundation. Location of abutments and piers outside of the potential thaw zone of the stream, or penetration at the most advantageous

points to depths sufficient to achieve the required bearing capacity, is essential. The design of piles based on depth of embedment, affreeze strength or dynamic driving formulas in frozen soils is of little value if the permafrost condition is later destroyed. Emphasis must be placed on retaining the original permafrost conditions and providing for frost

MP 1412

UNFROZEN WATER CONTENTS OF SUBMA-RINE PERMAFROST DETERMINED BY NU-CLEAR MAGNETIC RESONANCE.

CLEAR MAGNETIC RESONANCE.
Tice, A.R., et al, International Symposium on Ground
Freezing, 2nd, Trondheim, Norway, June 24-26, 1980.
Preprints, Trondheim, University, Norwegian Institute of Technology, 1980, p.400-412, 10 refs.
Anderson, D.M., Sterrett, K.F.

SUBSEA PERMAFROST, UNFROZEN WATER CONTENT, MELTING POINTS, NUCLEAR MAGNETIC RESONANCE, TEMPERATURE EFECTS, TEMPERATURE MEASUREMENT, DRILL CORE ANALYSIS.

DRILL CORE ANALYSIS.

Prior work resulted in the development of techniques to measure the unfrozen water contents in frozen soils by nuclear magnetic resonance (NMR). It has been demonstrated that NMR is a promising new method for the determination of phase composition (the measurement of unfrozen water content as a function of temperature) which circumvents many of the limitations inherent in the adiabatic and isothermal calorimetric techniques. The NMR technique makes it possible, in a non-destructive, non-intrusive way, to explore hysteresis by determining both cooling and warming curves. Corrections are made for dissolved paramagnetic impurities which have the effect of increasing the signal intensity at decreasing temperatures. The results demonstrate that NMR techniques can be effectively utilized both at and below the melting point of ice in frozen soils and that accurate melting points (freezing point depressions) can be determined.

MP 1413

MP 1413
COST-EFFECTIVE USE OF MUNICIPAL WAS-TEWATER TREATMENT PONDS.
Reed, S.C., et al, Session on Appropriate Technology in Water Supply and Waste Disposal at the ASCB National Convention, Chicago, Illinois, Oct. 16-20, 1978. ASCE preprint 3435, New York, American Society of Civil Engineers, 1979, p.177-200, 23 reft. Hais, A.B.

WASTE TREATMENT, WATER TREATMENT, PONDS, COST ANALYSIS, STATISTICAL ANALYSIS, DESIGN.

THEALT SIS, LESIGN.

Treatment ponds are a cost-effective alternative for municipal wastewaser treatment. When compared to other secondary treatment alternatives, ponds are generally the least costly, require less energy and less skilled operational attention. They can be designed to consistently meet BOD removal requirements and can achieve significant reductions in nutrients, bacteria, and viruses.

LAND TREATMENT SYSTEMS AND THE ENVI-RONMENT.

McKim, H.L., et al, Session on Appropriate Technology in Water Supply and Waste Disposal, at the ASCE National Convention, Chicago, Illinois, Oct. 16-20, 1978. ASCE preprint 3453, New York, American Society of Civil Engineers, 1979, p.201-225, 47 refs. Bouzoun, J.R., Martel, C.J., Palazzo, A.J., Urban, V.M. N.W.

35-2752 WASTE DISPOSAL, WATER TREATMENT, LAND RECLAMATION, SEEPAGE, FLOOD-ING, WASTE TREATMENT, ENVIRONMEN-TAL PROTECTION.

SELECTED DESIGN PARAMETERS OF EXIST-ING SYSTEMS FOR LAND APPLICATION OF LIQUID WASTE—A COMPUTER FILE.

Likandar, I.K., Annual Conference of Applied Research and Practice on Municipal and Industrial Waste, 2nd, Madison, Wisconsin, Sep. 17-21, 1979. Proceedings, 1979, p.65-88, 5 refs.

WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, COMPUTER PRO-GRAMS, DESIGN.

ORAMIN, DESIGN.

Due to increasing interest in renovating wastewater by application on land, a computer file was established to store and
retrieve information on design parameters, performance characteristics and published information on existing land application
systems. The purpose of establishing this file was to
provide assistance to design engineers during the planning
of new land treatment systems. Currently there are about
350 domestic and 75 foreign systems on file. Two hypothetical examples are included for illustration.

POTHOLE PRIMER: A PUBLIC ADMINISTRATOR'S GUIDE TO UNDERSTANDING AND MANAGING THE POTHOLE PROBLEM. Baton, R.A., coord, Hanover, N.H., U.S. Army CRREL, 1981, 24p., 9 refs. Preliminary draft for presentation at the 11th Annual New England Asphalt Paving Conference, University of New Hampshire, Durhaza, N.H., 17 March 1981.
Bilello, M.A.

ROAD MAINTENANCE, PAVEMENTS, DAM-AGE, FROST ACTION, MUNICIPAL ENGI-NEERING, SAPETY, PATIGUE (MATERIALS), DRAINAGE, CRACKING (FRACTURING).

MP 1417 LAND TREATMENT: PRESENT STATUS, FU-TURE PROSPECTS.

Pound, C.E., et al, Civil engineering, June 1978, 48(6), Pound, C.E., et al. Civil engineering. June 1978, 48(6), p.98-102, Also in: Articles on water and waste treatment, pollution control and related subjects. Reprinted from Civil engineering, Sep. 1977 through Sep. 1978, p.76-80.

Crites, R.W., Reed, S.C.
35-2760
LAND RECLAMATION, SEWAGE TREATMENT, WASTE TREATMENT, WASTE TREATMENT, WATER TREATMENT, LEGISLATION, WATER POLLUTION, COST ANALYSIS.

COST ANALYSIS.

EPA POLICY ON LAND TREATMENT AND THE CLEAN WATER ACT OF 1977.

Thomas, R.E., et al, Journal of water pollution control, Mar. 1980, 52(3), p.452-460, 10 refs.

Reed, S.C. 35-2759

WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, LEGISLATION, WATER POLLUTION, DESIGN.

MP 1419
TRAVELING WAVE SOLUTION TO THE PROBLEM OF SIMULTANEOUS FLOW OF WATER AND AIR THROUGH HOMOGENEOUS POROUS MEDIA.
Nakano, Y., Water resources research, Feb. 1981, 17(1), p.57-64, 16 refs.
35-2796

POROUS MATERIALS, WATER FLOW, AIR FLOW, WAVE PROPAGATION, HYDRAULICS, BOUNDARY LAYER, WETTABILITY, ANAL-YSIS (MATHEMATICS).

YSIS (MATHEMATICS).

A traveling wave solution was derived for the problem of simultaneous flow of water and sir through homogeneous porous media.

The properties of the solution generally depend upon the hydraulic characteristics of a given problem. The properties of the solution are presented for a specific case in which the hydraulic characteristics are given in specific functional forms. For this specific case a singularity occurs in the solution of both a saturated-unsaturated boundary and a wetting front. Some applications of the solution are discussed.

INTERNATIONAL AND NATIONAL DEVELOP-MENTS IN LAND TREATMENT OF WASTEWA-

TER.

McKim, H.L., et al, Technology Transfer Seminar on McKim, H.L., et al, Technology Transfer Seminar on

Jenkins, T.F., Martel, C.J., Palazzo, A.J.

WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, PONDS, IRRIGATION, INTERNATIONAL COOPERATION.

MP 1421 TOXIC VOLATILE ORGANICS REMOVAL BY TOXIC VOLATILE ORGANICS REMOVAL BY OVERLAND FLOW LAND TREATMENT.
Jenkins, T.F., et al, Water Pollution Control Federation. Annual Conference, 53rd, Las Vegas, Nev., Sep. 28-Oct. 3, 1980. Proceedings of the research symposia [Preprints], Washington, D.C., Water Pollution Control Federation, [1981], 14p., 27 refs.
Leggett, D.C., Martel, C.J., Peters, R.E., Lee, C.R. 35-2894
WASTE TERATMENTE WATER TERATMENTER. WASTE TREATMENT, WATER TREATMENT, SURFACE WATERS, FLOODING.

AQUACULTURE SYSTEMS FOR WASTEWA-TER TREATMENT: AN ENGINEERING AS-

Reed, S.C., et al, U.S. Environmental Protection Agency. Office of Water Program Operations. Technical bulletin, June 1980, 430/9-80-007, 127p., Refa. passim. For selected papers see 35-2860 and 35-2861.

Bastian, R.K. 35-2859

WASTE TREATMENT, WATER TREATMENT, SANITARY ENGINEERING, PONDS, COLD WEATHER PERFORMANCE.

MP 1423 ENGINEERING ASSESSMENT OF AQUACUL-TURE SYSTEMS FOR WASTEWATER TREAT-MENT: AN OVERVIEW.

Reed, S.C., et al, U.S. Environmental Protection Agency. Office of Water Program Operations. Technical bulletin, June 1980, 430/9-80-007, p.1-12. Bastian, R.K., Jewell, W. 35-2860

WASTE TREATMENT, WATER TREATMENT, SANITARY ENGINEERING, PONDS.

MP 142A MODELING A VARIABLE THICKNESS SEA ICE COVER. Hibler, W.D., III, Monthly weather review, Dec. 1980,

108(12), p.1943-1973, 62 refs. 35-3514

35-3514
SBA ICE, ICE COVER THICKNESS, SEASONAL VARIATIONS, DRIFT, THERMODYNAMICS, MODELS, LATENT HEAT, POLYNYAS, MASS BALANCE, ICE EDGE, ANALYSIS (MATH-EMATICS)

MP 1425 SEASONAL GROWTH AND ACCUMULATION OF NITROGEN, PHOSPHORUS, AND POTASSIUM BY ORCHARDGRASS IRRIGATED WITH MUNICIPAL WASTE WATER.

Palazzo, A.J., Journal of environmental quality, Jan.-Mar. 1981, 10(1), p.64-68, 23 refs. 35-3515

WASTE TREATMENT, WATER TREATMENT, IRRIGATION, LAND RECLAMATION, VEGETATION, GROWTH, SEASONAL VARIATIONS, GRASSES, NUTRIENT CYCLE

ORASSES, NOTREBUT CYCLES.

A 2-year field study was performed to determine the seasonal growth and nutrient accumulation of a forage grass receiving 7.5 cm/week of domestic primary-reside waste water. The average N and P concentrations in the waste water were 31.5 and 6.1 mg/liter, respectively. An established sward of Pennlate' orchardgrass (Dectylis glomerate L.) was managed on an annual three-cutting system. Grass samples were taken periodically during the growing season to determine plant dry matter accumulation and uptake of N, P, and K.

MP 1426
REVIEW OF SEA-ICE WEATHER RELATIONSHIPS IN THE SOUTHERN HEMISPHERE.
Ackley, S.F., International Association of Hydrological Sciences. Publication, 1981, No.131, Sea level,
ice and climatic change: proceedings of the symposium
held 7-8 Dec. 1979, edited by I. Allison, p.127-159,
Refa. p.157-159.
35-3026
SRA ICE DISTRIBUTION WEATHER WIND

SEA ICE DISTRIBUTION, WEATHER, WIND (METEOROLOGY), OCEAN CURRENTS, AN-

TARCTICA.
Within the last decade data on sea ice from satellite coverage have become available for the Southern Hemisphere. The data record is reviewed with some consideration given to the different mechanisms of ice advection by wind forcing, thermodynamic growth, and ocean mixing. These mechanisms control the ice edge around Antarctica and lead to the characteristic advance-retreat relationships for the Weddell Sea, East Antarctica, and the Ross Sea. Recent statistical and function (BOF) analyses have shown two primary areas of higher annual variation of sea ice conditions which are presumed to be of dynamic (winds and currents) rather than thermodynamic (temperature) origin. It is postulated that atmospheric forcing of the sea ice system causes changes in sir-sea energy transfers that then drive the atmospheric to its own anomaly condition. Further correlations that may define the mechanism of sea ice response to the forcing fields and supply stronger evidence of weather and climate responses to ice variations, may be available by analysis of the Global Weather Experiment drifting buoy data obtained during 1979. (Auth. mod.) (Auth. mod.)

SEA-ICE ATMOSPHERE INTERACTIONS IN THE WEDDELL SEA USING DRIFTING BUOYS.

Ackley, S.P., International Association of Hydrologi-cal Sciences. Publication, 1981, No.131, Sea level, ice and climatic change: proceedings of the symposium held 7-8 Dec. 1979, edited by I. Allison, p.177-191, 23

35-3029

SEAICE, ATMOSPHERIC CIRCULATION, PACK ICE, ATMOSPHERIC PRESSURE, DRIFT, AIR TEMP ATURE, WIND FACTORS, WEDDELL

SEA.

Air-dropted data buoys were placed on the Weddell Sea pack icc during December 1978. These buoys transmit information via the NIMBUS satellite giving data on their position, surface pressure, and surface temperature. The velocities of four buoys during fall showed values up to 40 cm/s (35 km/day). The highest sustained velocities appear to coincide with sudden drops in air temperature. Schwerdtfeger (1979) has postulated a model of winds in the western Weddell Sea dominated by thermal rather than pressure gradient forces due to the damming of cold air from continental barrier and katabatic winds against the mountains of the Antarctic Peninsula. This model is examined to explain the drift rates associated with cold air outbreaks. (Auth.) (Auth.)

MP 1428 DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAPROST BENEATH THE BEAUFORT SEA.

Selfmann, P.V., et al, Environmental assessment of the Alaskan continental shelf, Vol.4. Hazards. Princi-pal investigators' annual reports for the year ending March 1980, Rockville, Md., U.S. National Oceanic and Atmospheric Administration, 1981, p.125-157, 14

Chamberlain, E.J., Delaney, A.J., Neave, K.G.

33-3270
SUBSEA PERMAFROST, PERMAFROST DISTRIBUTION, BOTTOM SEDIMENT, DRILL CORE ANALYSIS, MAPPING, ENGINEERING, SEISMIC REFRACTION, WAVE PROPAGATION.

MP 1429 LAKE CHAMPLAIN ICE FORMATION AND ICE FREE DATES AND PREDICTIONS FROM METEOROLOGICAL INDICATORS.

Bates, R.B., Eastern Snow Conference, 37th. Proceedings, Peterborough, Ontario, Canada, 1980, p.125-143, 10 refs. For another version of this paper see 34-1745. 35-3153

LAKE ICE, ICE FORMATION, ICE GROWTH, FREEZEUP, ICE BREAKUP, WEATHER FORE-CASTING, ICE FORECASTING, WATER TEMPERATURE, WIND VELOCITY, LANDSAT, NAVIGATION.

NAVIGATION.

A 19-year record of annual closing and opening dates of the Lake Champlain ferry season was found to accurately approximate the freeze-over and breakup dates for the ferry crossing area between Gordon Landing, Vermont, and Cumberland Head, N.Y. These lake navigation records, when compared statistically with the lake's wintertime thermal structure and climatological data for the same years of at nearby Lake Champlain locations, allowed accurate predictions of ice formation. From nearby air temperature records, cumulative freezing degree-day (C) curves were pictited for each year of record and ice formation dates and standard deviations were predicted with considerable accuracy. Several methods of predicting ice formation on Lake Champlain were attempted. The most accurate approach used a combination of water temperatures and freezing degree-days. A method of predicting ice growth rates is shown and the influence of wind speed on ice cover formation and prediction on a large body of water such as this is also discussed. MP 1430 MP 1430

NEW 2 AND 3 INCH DIAMETER CRREL SNOW

Bates, R.E., et al, Bastern Snow Conference, 37th. Proceedings, Peterborough, Ontario, Canada, 1980, p.199-200, 1 ref. Extended abstract. Rand, J.H., Redfield, R. 25, 2142.

SNOW SAMPLERS, ROOFS, SNOW LOADS, SNOW WATER EQUIVALENT, ICE LENSES. MP 1431

SEA ICE STUDIES IN THE WEDDELL SEA ABOARD USCGC POLAR SEA.

Ackley, S.F., et al., Antarctic journal of the United States, 1980, 15(5), p.84-96, 7 refs.
Gow, A.J., Buck, K.R., Golden, K.M.

35-3188

SEA ICE, DRIFT, BIOMASS, WEDDELL SEA. The purpose of this study was to investigate several characteristics of Weddell Sea pack ice that may affect the relative roles of dynamics and thermodynamics of pack ice development in this region. The physical and structural properties of the pack ice were surveyed using core samples. Significant amounts of frazil ice were found. If this formation of frazil ice is as widespread as suspected, then the role of deformation (the opening and closing of leads and polynyas) may have a greater role in the formation of Weddell Sea pack ice than similar processes do in the arctic pack. Four data buoys were deployed. The initial locations are shown, and the studies for which the buoy data will be used are discussed. Observations during the cruise confirmed the ubiquitous presence of algae in nearly all forms of ice sampled and point to close links between pack ice formation and enhanced algal production. ed algal production.

ABIOTIC COMPONENTS; INTRODUCTION. Brown, J., Tundra ecosystems: a comparative analysis. Edited by L.C. Bliss, O.W. Heal and J.J. Moore. International biological programme, No.25. Cambridge University Press, 1981, p.79.

35-3377 ECOSYSTEMS, HYDROLOGY, CLIMATIC FAC-TORS, SOILS, SITE SURVEYS.

MP 1433

ANALYSIS OF PROCESSES OF PRIMARY PRODUCTION IN TUNDRA GROWTH FORMS. Tieszen, L.L., et al, Tundra ecosystems: a comparative niezzu, i.i., et al, l'undra ecosystems: a comparative analysis. Edited by L.C. Bliss, O.W. Heal and J.J. Moore. International biological programme, No.25, Cambridge University Press, 1981, p.285-356, Refs. p.348-356. 35-3384

TUNDRA, BIOMASS, GROWTH, NUTRIENT CY-CLE, WATER RESERVES, CLIMATIC FACTORS, SEASONAL VARIATIONS, SOIL TEMPERA-TURE, PHOTOSYNTHESIS.

MP 1434

POINT BARROW, ALASKA, USA.

Brown, J., Tundra ecosystems: a comparative analysis. Edited by L.C. Bliss, O.W. Heal and J.J. Moore. International biological programme, No.25, Cambridge University Press, 1981, p.775-776, 1 ref. 35-3400

ECOSYSTEMS, VEGETATION. METEOROLOGICAL DATA, ANIMALS, OR-GANIC SOILS, DECOMPOSITION, GEOMOR-PHOLOGY, UNITED STATES—ALASKA—BAR-ROW.

MP 1435

HEAT TRANSFER IN COLD CLIMATES. Lunardini, V.J., New York, Van Nostrand Reinhold , 1981, 731p., 35 refs.

35-3429
HEAT TRANSFER, MASS TRANSFER, PERMA-FROST PHYSICS, TEMPERATURE EFFECTS, PHASE TRANSFORMATIONS, SOIL PHYSICS, STEFAN PROBLEM, GROUND ICE, SNOW PHY-SICS, SOIL WATER, COLD WEATHER SURVIV-AL, SOLAR RADIATION.

MP 1436 INVESTIGATION OF THE ACOUSTIC EMIS-SION AND DEFORMATION RESPONSE OF FI-NITE ICE PLATES.

Xirouchakis, P.C., et al, Offshore Technology Conference, 13th, Houston, Texas, May 4-7, 1981. Proceedings, Vol.3, 1981, p.123-133, 34 refs.
St. Lawrence, W.F.

35-3448
ICE CRACKS, ICE ELASTICITY, PLATES, ACOUSTIC MEASUREMENT, VISCOELASTICITY, CRACKING (FRACTURING), ICE CRYSTALS, FLEXURAL STRENGTH.

A procedure is described for monitoring the microfracturing of ice plates subjected to constant loads. Sample time records of fresh water ice plate deflections as well as corresponding total acoustic emission activities are presented. The linear elastic as well as viscoelastic response for a simply supported rectangular ice plate is given. In the present investigation acoustic emission methods are used to study the microfracturing activity in polycrystalline ice subjected to flexural loads. The relationship between acoustic emissions and the time dependent inelastic flexural deformation in ice is studied. Furthermore, the influence of the magnitude of the applied load and the rate of deformation on cracking activity is explored. cracking activity is explored.

SOME APPROACHES TO MODELING PHASE CHANGE IN FREEZING SOILS.
Hromadka, T.V., II, et al, Cold regions science and technology, Apr. 1981, 4(2), p.137-145, 11 refs. Guymon, G.L., Berg, R.L. 35-3670

35-3670
SOIL FREEZING, PHASE TRANSFORMATIONS, THERMAL REGIME, UNFROZEN WATER CONTENT, SOIL WATER, MATHEMATICAL MODELS.

Phase change effects associated with freezing soils dominate the thermal state of the soil regime. Furthermore, freezing

of soil water influences the soil moisture regime by providing a moisture sink which tends to draw mobile soil moisture to freezing fronts. Consequently, it is critical to general purpose models that soil water phase change effects and the interrelated problem of estimating the moisture sink effects (i.e., conversion of liquid water to ice) be accurately modeled. The choice of such a model will not only influence the precision of simulated temperatures and water contents in a freezing soil, but will also have a significant impact on computational efficiency. A review of several current models that assume unfrozen water content is functionally related to subfreezing temperatures indicates that within a freezing soil the soil water flow model and heat transport model parameters are restricted in spatial gradients according to the spatial gradient of modeled unfroze water content. A freezing soil model based on the concept of isothermal phase change of soil water is proposed as an alternative approach.

MP 1438 CYLINDRICAL PHASE CHANGE APPROXIMA WITH EFFECTIVE THERMAL DIF-

TION WILL FUSIVITY.

FUSIVITY.

Lunardini, V.J., Cold regions science and technology, Apr. 1981, 4(2), p.147-154, 13 refs.

PHASE TRANSFORMATIONS, FREEZE THAW CYCLES, THERMAL DIFFUSION, PERMA-FROST HEAT BALANCE, LATENT HEAT, PIPES (TUBES), ANALYSIS (MATHEMATICS).

(10BBS), ANALYSIS (MATHEMATICS).

No exact, general, solution exists for phase change in a cylindrical geometry. In fact, even approximate solutions are rare and limited in applicability. The use of the effective thermal diffusivity concept has allowed a closed form approximate solution to be generated for phase change around a circular cylinder in an indefinite medium. The effective diffusivity method permits solutions to be found for phase change problems merely by solving the usually linear, zero latent heat problem analogous to the phase change problem. Phase change problems are often intractable with the usual mathematical methods. The cylindrical formulae siven here are abourt to be of accordable accuracy. with the usual mathematical methods. The cylindrical formulae given here are shown to be of acceptable accuracy, for most engineering purposes, over a wide range of parameters. No other simple, closed form, approximation is known for the cylindrical system. Although the accuracy of the effective diffusivity method has been demonstrated for the cylindrical geometry, application to other geometries must be verified.

COASTAL-INLAND DISTRIBUTIONS OF SUM-MER AIR TEMPERATURE AND PRECIPITAtion in northern alaska.

Haugen, R.K., et al, Arctic and alpine research, Nov. 1980, 12(4), p.403-412, 22 refs. 35-3196

TUNDRA, PRECIPITATION (METEOROLOGY), AIR TEMPERATURE, SHORES, LONG RANGE FORECASTING, WIND FACTORS, UNITED STATES—ALASKA—NORTH SLOPE.

STATES—ALASKA—NORTH SLOPE.
Using data from summer air temperature stations from the inland tundra to the immediate coastal area, regression analyses of the air temperature data from 1975 to 1978 were used to predict temperature wates across the Alaskan Arctic Coastal Plain based upon latitude and longitude. This provides the best approximation of average values based on existing data. Mean monthly temperature, mean daily range of temperature, and thawing-degree days all increase with distance from the coast. The estimated July normal for Attasook, 48 km south of the coast, is 3.7 C, while the established 30-yr normal for Barrow, on the coast, is 3.7 C. The July average temperature 6 km due south of the open water of Prudhoe Bay is 2 C higher than on the immediate coast. Within the area under the dominant influence of the sea breeze, regression analyses suggest a more precise relationship between air temperature and distance along the prevailing wind vector (N75 E) than between temperature and distance due north to the sea.

MODELING NITROGEN TRANSPORT AND TRANSFORMATIONS IN SOILS: 1. THEORETICAL CONSIDERATIONS.

Selim, H.M., et al, Soil science, Apr. 1981, 131(4), p.233-241, 24 refs. For Pt. 2 see 34-4080. Iskander, I.K.

35-4081

SOIL CHEMISTRY, NUTRIENT CYCLE, TRANS-FORMATIONS, SOIL WATER, WATER FLOW, WASTE TREATMENT, WATER TREATMENT, MATHEMATICAL MODELS.

MATHEMATICAL MODELS.

A numerical model was developed to simulate water and nitrogen transport and transformations through water-unsaturated, multilayered soil profiles. The nitrogen transformation processes considered were nitrification, denitrification, immobilization, mineralization, and ionic exchange of ammonism. Plant uptakes of water and nitrogen were also included. An explicit-implicit finite difference approximation method was used to solve the nitrogen transport and transformation equations simultaneously with the water flow equation. Model evaluation and sensitivity analysis for a wide range of values for the rate of nitrification, distribution coefficient for ammonium exchange, and rate of N uptake were investigated. (Auth.) (Auth.)

MODELING NITROGEN TRANSPORT AND TRANSFORMATIONS IN SOILS: 2. VALIDA-

Iskandar, I.K., et al, Soil science, May 1981, 131(5), p.303-312, 12 refs. For Pt. 1 see 35-4081. Selim, H.M.

35-4080

SOIL CHEMISTRY, NUTRIENT CYCLE, TRANS-FORMATIONS, WASTE TREATMENT, WATER TREATMENT, IONS, MODELS.

TREATMENT, IONS, MODELS.
The nitrogen model described in Part 1 was evaluated using experimental data from a greenhouse lysimeter study for two soils, Windsor sandy loam and Charlton silt loam. Secondary treated waste water was applied to each soil at the rate of 3.8 centimeters twice weekly for 25 weeks. Purthermore, (15) N-enriched NH4 cation-N was applied, at the beginning of the experiment, in one waste water application. A mixture of grasses was grown on esch lysimeter and was harvested every 2 to 4 weeks. Solution samples were collected and analyzed for N, and the soil water pressure head was monitored frequently at different soil depths. Model predictions agreed well with pressure head data with depth and time, as well as gravimetrically determined soil water content with depth for the two soils. (Auth. mod.)

MP 1442 ICE DISTRIBUTION AND WINTER SURFACE CIRCULATION PATTERNS, KACHEMAK BAY, ALASKA

Gatto, L.W., International Geoscience and Remote Sensing Symposium (IGARSS'81), Washington, D.C., June 8-10, 1981. Digest, Vol.2, New York, Institute of Electrical and Electronics Engineers, 1981, p.995-1001, 6 refs. 35-3591

SEA ICE DISTRIBUTION, OCEAN CURRENTS, REMOTE SENSING, WIND FACTORS, LAND-SAT, WINTER, SEASONAL VARIATIONS, UNITED STATES—ALASKA—KACHEMAK BAY.

INLET CURRENT MEASURED WITH SEASAT-1 SYNTHETIC APERTURE RADAR.

emdin, O.H., et al, Shore and beach, Oct. 1980, 48(4), p. 35-37, 4 refs. Jain, A., Hsiao, S.V., Gatto, L.W. 35-3704

WATER INTAKES, WATER FLOW, RADAR ECHOES, MICROWAVES, VELOCITY.

EFFECTIVENESS OF LAND APPLICATION FOR PHOSPHORUS REMOVAL FROM MUNICIPAL WASTE WATER AT MANTECA, CALIFORNIA.

Iakandar, I.K., et al, Journal of environmental quality, Oct.-Dec. 1980, 9(4), p.616-621, 18 refs. Syera, J.K. 35-3705

35-4166

SOIL CHEMISTRY, WASTE DISPOSAL, WATER TREATMENT, IRRIGATION, WASTE TREAT-MENT.

MENT.

The concentrations of dissolved inorganic phosphate (DIF) in soil solution collected at 0.3 and 1.6 m in soils which had received municipal waste water for 4 and 13 years ranged from 7.3 to 13.9 microgram P/ml. In some cases, these concentrations were higher than that in the added waste water. Sorption studies indicated that the ability of soils from the control site to remove added P from solution was low. Waste water addition caused a substantial decrease in the P sorption capacity of surface soils and a marked change in isotherm. Sorption capacity generally increased down the profile to 60 cm on the treated sites. Only a small proportion of the total P accumulated from waste water addition was in the organic form. Large amounts of P were extractable by 0.01 M CaCl2, particularly in the upper 45 cm of the profiles receiving waste water. Although lack of crop removal of P and a high infiltration rate may be partly responsible for the poor performance of the Manteca system in terms of P removal from waste water, the very low P sorption capacity of the soil is regarded water, the very low P sorption capacity of the soil is regarded as the major factor.

MP 1445 MODELING HYDROLOGIC IMPACTS OF WIN-TER NAVIGATION.

Daly, S.F., et al, Specialty Conference Water Forum '81, San Francisco, Aug. 10-14, 1981. Proceedings. Vol.2, New York, American Society of Civil Engineers, 1981, p.1073-1080, 12 refs.

ICE NAVIGATION, ICE LOADS, ICE BOOMS, ICE CONTROL, ICE JAMS, RIVER ICE, LAKE ICE, WATER LEVEL, WATER FLOW, MODELS. This paper reports on a study undertaken to determine the hydrologic and hydraulic impacts of a proposed winter naviga-

tion demonstration program on the St. Lawrence River. The study assessed the impacts of modifying currently operational ice control booms on the levels and flows of Lake Ontario and the St. Lawrence River at several locations to control ice jamming and subsequent adverse effects on the Mossianness Parter Part The cripty assumed that . The see jamming and subsequent adverse effects on the Moses-Saunders Power Dam. The study assumed that an ice control boom would be modified to allow vessel transits for winter navigation. A one-dimensional hydraulic tran-sient model that simulated water profiles and flows in the St. Lawrence River under both open water and ice covered conditions was utilized to determine the impacts of the increased ice cover thickness downstream caused by this modification. (Auth mod.)

MP 1446

SNOW REMOVAL EQUIPMENT.

Minak, L.D., Handbook of snow: principles, processes, management and use. Bdited by D.M. Gray and D.H. Male, Toronto, Pergamon Press, 1981, p.648-670, 11

35-3762

SNOW REMOVAL, EQUIPMENT, ROAMAINTENANCE, WINTER MAINTENANCE. ROAD

MP 1447

APPLICATION OF REMOVAL AND CONTROL METHODS. SECTION 1: RAILWAYS; SECTION 2: HIGHWAYS; SECTION 3: AIR-PORTS.

Minak, L.D., et al, Handbook of snow: principles, processes, management and use. Edited by D.M. Gray and D.H. Male, Toronto, Pergamon Press, 1981, p.671-706, 24 refs.
Brohm, D.R., Cohen, S., Hawkins, L.M.E.

35-3763 SNOW REMOVAL, ICE CONTROL, WINTER MAINTENANCE, ROAD MAINTENANCE, RAILROADS, AIRPORTS, BRIDGES, EQUIP-MENT, WHITEOUT, SNOW FENCES, SAND-

ICE CONTROL AT NAVIGATION LOCKS. Hanamoto, B., Specialty Conference Water Forum '81, San Francisco, Aug. 10-14, 1981. Proceedings. Vol.2. New York, American Society of Civil Engineers, 1981, p.1088-1095.

35-4168 CONTROL, ICE NAVIGATION, LOCKS (WATERWAYS), BUBBLING, TESTS.

A method for controlling ice at navigation locks is presented. A high-flow air screen placed across the entrance of a lock holds back ice floating downstream or pushed head of traffic. The analysis is based on low-flow bubbler systems. The applicability of this analysis to high-flow systems is examined by conducting laboratory tests. (Auth.)

MP 1449

ICE CONTROL ARRANGEMENT FOR WINTER NAVIGATION.

Perham, R.E., Specialty Conference Water Forum '81, San Francisco, Aug. 10-14, 1981. Proceedings. Vol.2, New York, American Society of Civil Engineers, 1981, p.1096-1103, 9 refs.

ICE NAVIGATION, ICE CONTROL, RIVER ICE, ICE JAMS, ICE BOOMS, WATER LEVEL.

ICE JAMS, ICE BOOMS, WATER LEVEL.

This paper presents a four-year summary of the main effects of the booms on ice and ship interaction and vice-versa.
Throughout the four winter seasons, relatively small quantities of ice were lost over and between the booms. Ships usually slid through without influencing the boom force levels, although, at times, the changes they wrought could be large. One boom needed strengthening and artificial islands were added for ice stability upstream. These devices and frequent icebreaker operations were able to compensate for the ice movement caused by winter navigation in this area.

AND 1450.

KINETIC NATURE OF THE LONG TERM STRENGTH OF FROZEN SOILS.

Plah, A.M., International Symposium on Ground Freezing, 2nd, Trondheim, Norway, June 24-26, 1980. Preprints, Trondheim, University, Norwegian Institute of Technology, 1980, p.95-108, 23 refs.

PROZEN GROUND STRENGTH, SOIL CREEP, STRESSES, SOIL TEXTURE, TRIAXIAL TESTS, RHEOLOGY, TEMPERATURE EFFECTS, ANALYSIS (MATHEMATICS).

ANALYSIS (MATHEMATICS).

Temperature dependencies of the failure activation energy of frozen soils in the temperature range from -0.55 to -20C were studied. The analysis was based upon experimental data on the long-term failure of six frozen soils: Manchester and Ottawa sands, Suffield and Bat-Bayoss clays, Hanover silt and Kelovey sandy loam. The failure activation energy was expressed as a function of the rheological parameters of the long-term strength equation in the form of the sum of two components: an initial value that is independent of failure stress and a stress-dependent increment of the activation energy. The analysis showed that the initial value of the failure activation energy varied between the limits of 10.4 and 19.4 kcal/mole, the variation of stress-dependent increments was between 0.3 and 6.6 kcal/mole,

and the sum varied from 12.9 to 19.7 kcal/mole. The smaller initial and sum values of the activation energy refer to the clay soils and the greater values to the sandy soils.

MP 1451

STRENGTH OF FROZEN SILT AS A FUNCTION

OF ICE CONTENT AND DRY UNIT WEIGHT.
Sayles, F.H., et al, International Symposium on
Ground Preezing, 2nd, Trondheim, Norway, June 2426, 1980. Preprints, Trondheim, University, Norwegian Institute of Technology, 1980, p.109-119, 12 refs.
Carbee, D.L.

FROZEN GROUND STRENGTH, GROUND WA-TER, WATER CONTENT, STRESS STRAIN DIA-GRAMS, COMPRESSIVE PROPERTIES, GROUND ICE, LOADS (FORCES), GRAIN SIZE. GROUND ICE, LOADS (FORCES), GRAIN SIZE. A total of 45 unconfined compression tests were conducted on frozen specimens of remolded, saturated Fairbanks silt at dry unit weights ranging from 993 to 1490 kilograms per cubic meter with total water contents ranging from 0.28 to 0.58. The rotal water contents ranging from the criterion that the ice matrix in the soil fractures at the first point of significant yield shown in the stress-strain curve, which occurs at less than 0.01 strain in this study, the "ice matrix strength" is shown to be nearly proportional to the volumetric ice content of the soil for these tests. The strength at 0.2 strain appears to be nearly independent of the dry unit weight and water content of the soil.

MP 1452

OVERCONSOLIDATION **EFFECTS**

Chamberlain, E.J., International Symposium on Ground Freezing, 2nd, Trondheim, Norway, June 24-26, 1980. Preprinta, Trondheim, University, Norwegian Institute of Technology, 1980, p.325-337, 10 refs. 36-27

guan institute of technology, 1980, p.325-337, 10 reas.
36-27
SOIL FREEZING, CLAY SOILS, FREEZE THAW
TESTS, FROZEN GROUND SETTLING, FROZEN
EN GROUND STRENGTH, FROZEN GROUND
MECHANICS, SOIL WATER MIGRATION,
WATER CONTENT, STRESSES, DENSITY
(MASS/VOLUME), SOIL STRUCTURE.
Settlement of clay soils after freezing and thawing is the
result of the suction forces that draw pore water to the
freezing front. These suction forces cause an increase
in the effective stress on the clay beneath the freezing
front, and thus cause an overconsolidation of the clay. As
these suction forces often exceed 1 atmosphere, their direct
measurement is not easy. The volume changes resulting
from the freezing and thawing of clays are related to the
plastic limit and have been observed in the laboratory to
be as high as 25%. If provisions are not made to account
for these volume changes in a ground freezing project, considerable damage to structures can occur from settlement and
the resulting stresses.

MP 1453
STUDY OF THE CHOANOFLAGELLATES
(ACANTHOECIDAE) FROM THE WEDDELL
SEA, INCLUDING A DESCRIPTION OF DIAPHANOECA MULTIANNULATA N. SP.

Phanoeca multiannulata N. Sp.

Description of managadory, Feb. 1981, 28(1).

Buck, K.R., Journal of protozoology, Feb. 1981, 28(1), p.47-54, 20 refs. 36-454

SEA ICE, MICROBIOLOGY, MARINE BIOLO-GY, ANTARCTICA—WEDDELL SEA.

Eight species of loricate chosnoflagellates (Acanthoscidae) have been observed, by light and electron microscopy, in samples obtained from the Weddell Sea during the austral aummer of 1977. The distribution of most species within the Weddell Sea was widespread. Habitats included the the Weddell See was widespread. Habitats included the water column, the edge of (or ponds on) ice floes, and the interior of ice floes. The distributional, environmental, habitat, and/or morphological range of all previously described species is expanded. Methods of variation of transverse costal diameters between genera may be potentially useful to the understanding of taxonomy and phylogeny of this family. (Auth. mod.)

MP 1454

NUMERICAL SOLUTIONS FOR RIGID-ICE MODEL OF SECONDARY FROST HEAVE.

O'Neill, K., et al., International Symposium on Ground Freezing, 2nd, Trondheim, Norway, June 24-26, 1980. Preprinta, Trondheim, University, Norwegian Insti-tute of Technology, 1980, p.656-669, 10 refs. Miller, R.D.

36-54

PROST HEAVE, GROUND ICE, SOIL FREEZ-ING, ICE FORMATION, ICE LENSES, ANAL-YSIS (MATHEMATICS), TEMPERATURE EP-FECTS.

ON THE ACOUSTIC EMISSION AND DEFOR-MATION RESPONSE OF FINITE ICE PLATES. Xirouchakis, P.C., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 6th, Québec, Canada, July 27-31, 1981. Proceedings, Québec, Canada, Université Laval, 1981, p.385-394, 15 refs.

36-226 30-220
ICE ACOUSTICS, ICE CRACKS, FRACTURING, FLEXURAL STRENGTH, ICE LOADS, ICE CRYSTAL STRUCTURE, MICROSTRUCTURE, ICE DEFORMATION, STRESSES, STRAIN TESTS, ANALYSIS (MATHEMATICS).

In the present investigation acoustic emission methods are used to study the microfracturing activity in polycrystalline ice subjected to fleatural loads. Experimental results obtained in the laboratory indicate that the acoustic emissions recorded from ice are important in describing the deformation and fracture of ice.

MP 1456

OF

DYNAMIC ICE-STRUCTURE INTERACTION ANALYSIS FOR NARROW VERTICAL STRUC-

Cranti, E., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 6th, Québec, Canada, July 27-31, 1981. Proceedings, Québec, Canada, Université Laval, 1981, p.472-479, 7

Haynes, F.D., Määttänen, M., Soong, T.T.

36-233
ICE SOLID INTERFACE, ICE MECHANICS, ICE LOADS, ICE PRESSURE, ICE STRUCTURE, DYNAMIC LOADS, PENETRATION TESTS, EXPERIMENTATION, FATIGUE (MATERIALS).

PERIMENTATION, FATIGUE (MATERIALS). This paper describes a method of computing the ice force and response of the structure on the basis of information given for ice velocity and properties of ice and the structure. The method is a step-by-step procedure using mode shape analysis involving two basic phases. During the first phase the structure penetrates into the ice sheet until a random loading rate dependent ice strength is reached. The ice sheet then fails within an area with finite length. Both the penetration and the failed zone are assumed to depend linearly on force. The ice forces and structural responses have been computed for a test structure at the U.S. Army Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire, and the results are found to be consistent with those sectually measured in laboratory experiments.

MP 1457 MP 1457

SUMMER CONDITIONS IN THE PRUDHOE BAY AREA, 1953-75.
Cox, G.F.N., et al, International Conference on Port

and Ocean Engineering under Arctic Conditions, 6th, Québec, Canada, July 27-31, 1981. Proceedings, Québec, Canada, Université Laval, 1981, p.799-808, 9

Dihn. W.S.

36-262

36-202 SEA ICE DISTRIBUTION, ICE CONDITIONS, RADIOMETRY, SEASONAL VARIATIONS, PE-TROLEUM INDUSTRY, ICE BREAKUP,

PREZEUP.

Long-term, site-specific statistics on the nummer ice conditions in the Harrison Bay-Camden Bay area are presented in probabilistic terms. The statistics are based on twenty-three years of ice observations acquired by commercial sites and icobreakers, ice reconnaissance flights, and various satisfies. Data is given on breakup and freezeup dates, the first occurrence of open water, and the number of continuous and total open water days. The impact of the summer ice conditions on petroleum activities in the study area are also briefly discussed.

MAP 1448

MP 1458 PRELIMINARY RESULTS OF ICE MODELING IN THE EAST GREENLAND AREA.

Tucker, W.B., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 6th, Québec, Canada, July 27-31, 1981. Proceedings, Québec, Canada, Université Laval, 1981, p.867-878,

Hibler, W.D., III.

36-267

ICE MODELS, ICE PLASTICITY, STRESSES, DRIFT, THERMODYNAMICS, SEA ICE, BUOY-ANCY, VISCOSITY.

ANCY, VISCOSITY.

A sea ice model which employs a viscous-plastic constitutive law has been applied to the East Greenland area. The model is run on a 40-km spatial scale at 1/4 day time steps for a 60-day period, using forcing data beginning 1 October 1979. Preliminary results verify that the model predicts reasonable thicknesses and velocities well within the ice margin. Separate simulations show that thermodynamics only and free drift with thermodynamics produce inadequate results. In particular, the free drift simulation produces unrealistic ice trajectories with excessive drift toward the coast and unreasonable nearshore thicknesses. The net results of these simulations tend to verify that internal

POOLING OF OIL UNDER SEA ICE.

Rovecs, A., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 6th, Québec, Canada, July 27-31, 1981. Proceedings, Québec, Canada, Université Laval, 1981, p.912-922,

Morey, R.M., Cundy, D.F., Dicoff, G. 36-271

OIL SPILLS, SEA ICE, ICE BOTTOM SURFACE, ICE COVER THICKNESS, PROFILES, RADAR ECHOES, ECHO SOUNDING, WATER POLLUTION, ENVIRONMENTAL IMPACT.

TION, ENVIRONMENTAL IMPACI.

los thickness profiles were constructed for six fast ice locations in the vicinity of Prudhoe Bay, Alaska, using a radar echo acunding system. The sounding data revealed in detail the undulating relief of the bottom of the sea ice in which oil could pool up if released under the ice. In general, ice bottom morphology was found to reflect variation of the surface snow cover thickness and ice deformation. However, at several sites the ice bottom relief could not be correlated with these factors. Slush ice accumulations of up to 0.5 m were apparently the cause of this bottom roughness. Retimates of the volume of oil that could need up in the ice bottom relief range from 20,000 to 60,000 roughness. Batimates of the volume of oil that could pool up in the ice bottom relief range from 20,000 to 60,000 ca m/sq km. For undeformed fast ice with no bottom about 10,000 to 35,000 cu m/sq km. The effect of slush ice relief and structure on potential under-ice oil pooling is for the most part unknown.

MP 1460

MP 1440
SEA ICE PILING AT FAIRWAY ROCK, BERING
STRAIT, ALASKA: OBSERVATIONS AND
THEORETICAL ANALYSIS.
Kovaca, A., et al, International Conference on Port
and Ocean Engineering under Arctic Conditions, 6th,
Québec, Canada, July 27-31, 1981. Proceedings,
Québec, Canada, Université Laval, 1981, p.985-1000, 15 refa

Sodhi, D.S. 36-276

36-276
SEA ICE, ICE PILEUP, ICE CONDITIONS, ICE
PORMATION, PRESSURE RIDGES, REMOTE
SENSING, LANDSAT, GROUNDED ICE, FLEX-URAL STRENGTH, FLOATING ICE, ANALYSIS
(MATHEMATICS), OFFSHORE STRUCTURES.

(MATHEMATICS), OFFSHORE STRUCTURES.

Information on sea ice conditions in the Bering Strait and
the losfloot formation around Fairway Rock, located in the
strait, is presented. Cross-sectional profiles of Fairway
Rock and the relief of the locfloot are given along with
theoretical analyses of the possible forces active during locfloot
formation. It is shown that the loc cover most likely
falls in flexure as opposed to crushing or buckling, as the
former requires less force. Field observations reveal that
the Fairway Rock ioeffoot is massive, with ridges up to
15 m high, a seaward face only 20 deg from vertical, and
interior ridge slopes averaging 33 deg. The icefoot is
believed to be grounded, and its width ranges from less
than 10 to over 100 meters.

MCP 1461

MP 1461

PLANETARY AND EXTRAPLANETARY EVENT RECORDS IN POLAR ICE CAPS.

Zeller, B.J., et al. Colloquium on Planetary Water, 3rd, Niagara Falls, New York, Oct. 27-29, 1980. Proceedings, Buffalo, N.Y., State University of New York, (1980), p.18-27, 6 refa. Parker, B.C., Gow, A.J. 36-365.

ICE SHEETS, LAND ICE, GLACIER MASS BAL-ANCE, PLANETARY ENVIRONMENTS, ATMO-SPHERIC COMPOSITION, VOLCANIC ASH.

A curve of nitrate-N concentration, plotted from 1653 individual snalyses from a 108 meter firm core drilled at South Pole Station in 1978-79, is presented. The most prominent feature of the beckground curve is the sharp drop in nitrate between 1650 and 1720, a period of unusually low solar activity. It is suggested that a comparison of this data with those of polar caps of other planets would make it possible to identify solar system-wide effects.

MCP 1462 MP 1442

MF 1462
DISTINGUISHING CHARACTERISTICS OF
DIAMICTONS AT THE MARGIN OF THE
MATANUSEA GLACIER, ALASKA.
Lawson, D.E., Annals of glaciology, 1981, Vol.2, p.78-

84. 34 refs. 36-636

GLACIAL DEPOSITS, SUBGLACIAL DRAIN-AGE, MORAINES, SEDIMENT TRANSPORT.

AGB, MORAINES, SEDIMENT TRANSPORT.
The origins of dismictons deposited at the Matanuska Glacier are identified in stratigraphic sequences mainly by the presence or absence of a pebble fabric, internal structure, and variation in gravet-size clear distribution. These properties correlate with major differences in depositional mechanisms and source material.

Melti-out till mostly inherits fabric, internal structure, and grain-size distribution from its debrie-inden basal ice source.

Sediment flow deposits and ice-slope colluvium d by ablational slope process es) have properties devel-s. Melt-out till range

ice stress, thermodynamics, and ice import must be considered to properly model this region.

AP 1459

from structureless to stratified with interspersed lenses and discontinuous laminae, and generally possesses a well-defined pebble fabric.

MP 1463 ECOLOGICAL IMPACT OF WHEELED, TRACKED, AND AIR CUSHION VEHICLE TRAFFIC ON TUNDRA.

Abele, G., International Society for Terrain-Vehicle Systems. International Conference, 7th, Calgary, Alberta, Aug. 16-20, 1981. Proceedings, Hanover, N.H., ISTVS, 1981, p.11-37, 19 refs.

TUNDRA, DAMAGE, ALL TERRAIN VEHI-CLES, TRACKED VEHICLES, ENVIRONMEN-TAL IMPACT, VEHICLE WHEELS, PLANT ECOLOGY.

Traffic tests were conducted on Alaskan tundra near Barrow rrame tests were conducted on Alsakan tundra near Barrow in 1971. The impact of an air cushion vehicle is significantly less than that of a tracked or wheeled vehicle and is limited to whatever damage is done to the vegetation by skirt contact; the effects of cushion pressure and cushion air flow are insignificant. The impact of wheeled and tracked vehicles influenced primarily by the type and geometry of tires or tracks, ground contact pressure, and the number of traffic nesses.

MP 1464 SUBSEA TRENCHING IN THE ARCTIC.

Mellor, M., International Society for Terrain-Vehicle Systems. International Conference, 7th, Calgary, Alberta, Aug. 16-20, 1981. Proceedings, Hanover, N.H., ISTVS, 1981, p.843-882, Refs. p.873-875.

TRENCHING, OCEAN BOTTOM, BOTTOM SEDIMENT, PIPELINES, ICE SCORING, PRESURE RIDGES, ICEBERGS.

SURE RIDGES, ICEBERGS.

Bavironmental conditions are described for the continental shelf of the western Arctic, and for the shelf of Labrador and Newfoundland.

Special emphasis is given to the gouging of bottom sediments by ice pressure ridges and icebergs, and an approach to systematic risk analysis is outlined. Protection of subsea pipelines and cables by treaching and direct embedment is discussed, touching on burial depth, degree of protection, and environmental impact. Conventional land techniques can be adapted for trenching across the beach and through the shallows, but in deeper water special equipment is required.

MP 1465 MORPHOLOGICAL INVESTIGATIONS OF FIRST-YEAR SEA ICE PRESSURE RIDGE SAILS.

Tucker, W.B., et al, Cold regions science and technology, 1981, Vol.5, p.1-12, 16 refs.
Govoni, J.W.

36-811

PRESSURE RIDGES, SEA ICE, ICE STRUCTURE. ICE COVER THICKNESS, OFFSHORE STRUC-TURES, ICE PRESSURE, ICE STRENGTH.

COLD WEATHER CONSTRUCTION MATERIALS; PART 2—REGULATED-SET CEMENT FOR COLD WEATHER CONCRETING, FIELD VALI-DATION OF LABORATORY TESTS.

HOUSTON OF LABORATORY TESTS.
HOUSTON, B.J., et al, U.S. Army Engineer Waterways
Experiment Station, Vicksburg, Mississippi. Miscellaneous paper, Sep. 1981, C-75-11, 33p.
Hotor, G.C.
10.1028

36-1028

36-1028
CONSTRUCTION MATERIALS, WINTER CONCRETING, CONCRETE STRENGTH, CEMENTS, CONCRETE PLACING, CONCRETE AGGREGATES, TEMPERATURE EFFECTS, TESTS.

SURFACE DISTURBANCE AND PROTECTION DURING ECONOMIC DEVELOPMENT OF THE NORTH.

Brown, J., et al, Novosibirak, Nauka, 1981, 88p., in Russian with English table of contents enclosed. Refs. p.59-80.

Grave, N.A. 36-1009

PERMAPROST PRESERVATION, HUMAN FAC-TORS, DAMAGE, OIL SPILLS, PERMAPROST DISTRIBUTION.

MP 1468 SEA ICE: THE POTENTIAL OF REMOTE SENS-ING

Weeks, W.F., Oceanus, Fall 1981, 24(3), p.39-48. 36-1047

SEA ICE, LAKE ICE, ICE PHYSICS, REMOTE SENSING, SPACEBORNE PHOTOGRAPHY.

MP 1469
MODELING OF ANISOTROPIC ELECTROMAGNETIC REFLECTIONS FROM SEA ICE. Golden, K.M., et al, Journal of geophysical research, Sep. 20, 1981, 86(C9), p.8107-8116, 17 refs. Ackley, S.F. 36-1089

SEA ICE, ICE SALINITY, ELECTROMAGNETIC PROPERTIES, ANISOTROPY.

PROPERTIES, ANISOTROPY.

The contribution of brine layers to observed reflective anisotropy of sea ice at 2100 MHz is quantitatively assessed, and a theoretical explanation for observed reflective anisotropy is proposed in terms of anisotropic electric flux penetration into the brine layers. The sea ice is assumed to be a stratified dielectric consisting of prue ice containing ellipsoidal conducting inclusions (brine layers) uniformly aligned with their long axes perpendicular to the preferred crystallographic c axis direction. The symmetrical geometry of the brine layers is shown to produce an anisotropy in the complex dielectric constant of sea ice. The contribution of these layers to the reflective anisotropy is examined with a numerical method of approximating the reflected power of a radar pulse incident on a slab of sea ice. (Auth. mod.)

MP 1470

INTEGRAL TRANSFORM METHOD FOR THE LINEARIZED BOUSSINESO GROUNDWATER FLOW EQUATION.

Daly, C.J., et al, Water resources research, Aug. 1981, 17(4), p.875-884, 10 refs.
Morel-Seytoux, H.J.

GROUND WATER, WATER FLOW, MATH-EMATICAL MODELS, SOIL WATER.

EMATICAL MODELS, SOIL WATER.

An analytical procedure is developed for the determination of potentiometric head in nonhomogeneous aquifers. Both steady and unsteady flow conditions are considered. The analytical procedure is based upon the use of orthogonal functions. It consists essentially of assuming an appropriate orthogonal series for both the aquifer properties and the unknown potentiometric head. The technique is applied to several one- and two-dimensional flow problems where conditions are described by the linearized Bouseinseq equation. The result of the analysis is the expression of potentiometric heads in analytic form. Subsequent use of Darcy's law yields accurate, enalytic equations for the associated velocity fields. Such representations of the flow field are a potential benefit for prediction of mass transport in groundwater since velocity is known as a continuous function of space and time. Other useful features of the orthogonal series approach include its straightforward application. The approach is include its straightforward application. The app also shows to eliminate the introduction of discr errors associated with the use of node systems wh required by many alternative numerical methods.

MP 1471 **WATERSHED MODELING IN COLD REGIONS:** AN APPLICATION TO THE SLEEPERS RIVER RESEARCH WATERSHED IN NORTHEAST-ERN VERMONT.

Stokely, J.L., Hanover, N.H., Dartmouth College, June 1980, 241p., M.E. thesia. Refa. p.175-192. 36-1275

36-1275
WATERSHEDS, SNOWMELT, RUNOFF, FROZBN GROUND, SOIL WATER, STREAM FLOW,
SNOW ACCUMULATION, ABLATION, MODBLS, COMPUTER APPLICATION, HYDROLO-GY, FLOODS

DISTORTION OF MODEL SUBSURFACE RADAR PULSES IN COMPLEX DIELECTRICS. Arcone, S.A. Radio science, Sep.-Oct. 1981, 16(5), p.855-864, 19 refs. 36-1864

SEA ICE, GROUND ICE, ICE ELECTRICAL PROPERTIES, RADAR ECHOES, SUBSURFACE INVESTIGATIONS, WAVE PROPAGATION, ELECTRIC FIELDS, MATHEMATICAL MOD-ELS, DIELECTRIC PROPERTIES.

ELS, DIELECTRIC PROPERTIES.

The propagation of subsurface radar pulses in complex dielectric media is studied numerically. The model waveform is a 10-ns sinusoidal cycle, and the media properties are similar to those of moist ground or see ice. When the real part of the dielectric permittivity is frequency independent and the imaginary part is dominated by the dc resistivity, amplitudes of the positive and negative half cycles unbalance, and the sinusoidal zero crossing is delayed from its normal position. In these cases, if reflector depth is known, the dielectric constant can be measured from the time delay of the leading edge of the signal, and the dc resistivity can be estimated from a comparison of the input and output pulse power spectra. When dielectric permittivity is frequency dependent through a simple relaxation process, waveform distortion depends on relaxation frequency. In addition, if reflector depth is known, the dielectric relaxation parameters may be estimated when the medium relaxation process, waveform the subsequency its above and below the major portion of the pulse bandwidth, respectively.

SNOW MEASUREMENTS IN RELATION TO VEHICLE PERFORMANCE.

Harrison, W.L., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, July, 1981, No.81-16, p.13-24, ADA-106 972, 2 refs. 36-1392

SNOW COMPRESSION, VEHICLES, TRACTION, SNOW DEPTH, SNOW DRIPT, SNOW CRYSTAL STRUCTURE, SNOW DENSITY, SNOW COVER

APPLICATION OF ENERGETICS TO VEHICLE TRAFFICABILITY PROBLEMS.

Brown, R.L., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, July, 1981, No.81-16, p.25-38, ADA-106 972, 8 refs. 36-1393

SNOW COVER EFFECT, TRACT'ON, VEHI-CLES, TRAFFICABILITY, SNOW DENSITY, SNOW COMPACTION.

MP 1475

PREDICTION METHODS.
Harrison, W.L., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, July, 1981, No.81-16, p.39-46, ADA-106 972.

SNOW COVER EFFECT, TRACTION, VEHI-CLES, TRAFFICABILITY, SNOW STRENGTH, FORECASTING, MATHEMATICAL MODELS, SNOW DEPTH, VEHICLE WHEELS, TRACKED

MP 1478
FIELD INVESTIGATIONS.
Harrison, W.L., U.S. Army Cold Regions Research and Bagineering Laboratory. Special report, July, 1981, No.81-16, p.47-48, ADA-106 972.

SNOW COVER EFFECT, TRACTION, VEHI-CLES, TRAFFICABILITY, TESTS.

ANALYSIS OF VEHICLE TESTS AND PER-FORMANCE PREDICTIONS.

Berger, R.H., et al, U.S. Army Cold Regions Rese and Engineering Laboratory. Special report, July, 1981, No.81-16, p.51-67, ADA-106 972.

Brown, R.L., Harrison, W.L., Irwin, G.S.

36-1396 SNOW STRENGTH, VEHICLES, TRACTION, SHEAR STRESS, LOADS (FORCES), SNOW COMPACTION, TESTS, SNOW DEPTH, FORE-CASTING, ANALYSIS (MATHEMATICS).

MP 1478

SHALLOW SNOW TEST RESULTS.
Harrison, W.L., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, July, 1981, No.81-16, p.69-71, ADA-106 972. 36-1397

SNOW DEPTH, SNOW COVER EFFECT, VEHI-CLES, TRACTION, TRAFFICABILITY, SHEAR STRESS, TESTS.

OBSERVATIONS OF CONDENSATE PROFILES OVER ARCTIC LEADS WITH A HOTFILM ANEMOMETER.

Andreas, E.L., et al, Royal Meteorological Society, London. Quarterly journal, 1981, Vol.107, p.437-460, Refs. p.457-460. Williams, R.M., Paulson, C.A.

36-1199

POLYNYAS, PACK ICE, PROFILES, DROPS (LIQUIDS), TURBULENT EXCHANGE, WATER TEMPERATURE, TEMPERATURE GRADIENTS, CONDENSATION, ANEMOMETERS, ENTS, CONDENSATION, ANEMOMETERS, ANALYSIS (MATHEMATICS).

MP 1486 THERMAL ENERGY AND THE ENVIRON-

MENT.
Crosby, R.L., et al, Hanover, N.H., U.S. Army Cold
Regions Research and Engineering Laboratory, Nov.
1975, 3p. + 2p. figs., Presented at Energy and Environment Conference, Dallas, Texas.
Aamot, H.W.C., Wright, E.A.

36-1422

HEAT SOURCES, HEAT LOSS, THERMAL EFFECTS. THERMAL POLLUTION, ENVIRON-MENTAL IMPACT, COLD WEATHER CON-STRUCTION, POLAR REGIONS.

INLET CURRENT MEASURED WITH SEASAT-Shemdin, O.H., et al, Shore and beach, Oct. 1980, 48(4), r.3.-37, 4 refs. Jain, A., Hsiao, S.V., Gatto, L.W. 36-1430

36-1430 WATER INTAKES, OCEAN CURRENTS, REMOTE SENSING, AIRBORNE RADAR, MI-CROWAVES.

MP 1482 COMPARISON OF THERMAL OBSERVA-TIONS OF MOUNT ST. HELENS BEFORE AND DURING THE FIRST WEEK OF THE INITIAL 1980 ERUPTION.

St. Lawrence, W.F., et al, Science, Sep. 26, 1980, Vol.209, p.1526-1527, 11 refs. Qamar, A., Moore, J., Kendrick, G. 36-1549

30-1349
THERMAL REGIME, VOLCANOES, TEMPERA-TURE MEASUREMENT, INFRARED RECON-NAISSANCE, MOUNTAINS, VOLCANIC ASH, UNITED STATES—WASHINGTON—MOUNT SAINT HELENS.

MP 1483 RESULTS FROM A MATHEMATICAL MODEL OF PROST HEAVE.

Guymon, G.L., et al, Transportation research record, 1981, No.809, p.2-6, 13 refs.
Berg, R.L., Johnson, T.C., Hromadka, T.V., II. 36-1729

FROST HEAVE, HEAT TRANSFER, SOIL WATER MIGRATION, PROST PENETRATION, TEMPERATURE EFFECTS, MATHEMATICAL MODELS.

MODELS.

A one-dimensional model for simulation of frost heave in a vertical soil column is preented. The model is based on simulaneous computation of heat and moisture transport in a freezing or thawing soil. Thermal processes at the freezing front are approximated by a lumped isothermal approach. The model accurately simulates frost heave, soil pore-water pressures, and temperatures when compared with a laboratory freezing column; however, to achieve adequate correlation certain model parameters must be determined by calibration. Because the model, like the frost-heave process itself, is highly sensitive to environmental and soil parameters that are variable in both time and space, purely deterministic simulations will not provide sufficiently accurate predictions. Consequently, further development of the model is required in order to include a statistical-probabilistic approach for estimating frost heave within specified confidence limits.

MP 1484 RESILIENT MODULUS OF A GRANULAR SOIL EXHIBITING NONLINEAR BEHAVIOR.

Cole, D.M., et al, Transportation research record, 1981, No.809, p.19-26, 15 refs. lrwin, L.H., Johnson, T.C.

36-1732

FREEZE THAW CYCLES, SUBGRADE SOILS, SOIL STRENGTH, SOIL FREEZING, GROUND THAWING, ELASTIC PROPERTIES, STRESSES, DENSITY (MASS/VOLUME), SOIL TEMPERA-TURE.

Preeze-thaw cycles experienced in areas of seasonal frost can cause wide variations in the supporting capacity of subgrade materials. The U.S. Army Cold Regions Research and Engineering Laboratory is currently engaged in a program to assess these variations in a number of soils used 'n roadway and airfield construction. The complete testing and analysis procedure for one of these test soils is presented.

MP 1485 SIMULATING FROST ACTION BY USING AN INSTRUMENTED SOIL COLUMN. Ingersoil, J., et al, Transportation research record, 1981, No.809, p.34-42, 6 refs.

Berg, R.L. 36-1734

FROST ACTION, FROZEN GROUND MECHAN-ICS, FREEZE THAW TESTS, SOIL WATER, SOIL TEMPERATURE, WATER CONTENT, MATH-EMATICAL MODELS.

EMATICAL MODELS.

The use of an instrumented soil column in tests to develop a mathematical model of the frost-heave process is described. Tensiometers, heat-flow meters, thermocouples, and electrical resistivity gages were installed throughout a soil column filled with Pairbanks siit, Chena Hot Springs siit, or West Lebanon gravel. The column was 100 cm long and about 14 cm in diameter. An open system was used and absorption was monitored during the freezing process. Tests were conducted by using a constant rate of frost penetration, a constant heat-flow rate, or three sequentially lower temperature step changes at the soil surface. The soil column has provided critical data for verification of a one-dimensional mathematical model for estimating frost heave. As more soils are tested, this equipment will assist in improving and

developing algorithms for the mathematical model and the most critical parameters that affect frost heave to a given soil-e.g., surcharge, free water level, and hydraulic conductivity. A procedure is also presented for determining the saturated and unsaturated hydraulic conductivity and moisture-retention characteristics of a soil.

COMPARATIVE EVALUATION OF FROST-CHARGE TRAILITY EVALUATION OF FROST-SUSCEPTIBILITY TESTS. Chamberlain, E.J., Transportation research record, 1981, No.809, p.42-52, 89 refs.

36-1735
36-1735
SOIL FREEZING, SOIL WATER, FROST RESISTANCE, FROST HEAVE, GROUND ICE, FREEZE THAW TESTS, FROST ACTION, GRAIN SIZE, PARTICLE SIZE DISTRIBUTION.

PARTICLE SIZE DISTRIBUTION.

Methods of determining the frost susceptibility of soils are identified and presented. More than 100 criteria were found; the most common were based on particle-size characteristics. These particle size criteria are frequently sugmented by information such as grain-size distribution, uniformity coefficients, and Atterberg limits. Other types of information, such as permeability, mineralogy, and soil classification, have also been required. More complex methods that require tests based on pore-size distribution, moisture tension, hydraulic conductivity, heave streas, and frost heave have also been proposed. However, none has proved to be a universal test for determining the frost susceptibility of soils. Based on this survey, four methods are proposed for further study: the U.S. Army Corps of Engineers Prost-Susceptibility Classification Systems, the moisture-tension/hydraulic-conductivity test, a new frost-heave test, and the California bearing ratio after-thaw test.

MP 1487

SIMULATION OF THE ENRICHMENT OF AT-MOSPHERIC POLLUTANTS IN SNOW COVER

Colbeck, S.C., Water resources research, Oct. 1981, 17(5), p.1383-1388, 17 refs. 36-1887

AIR POLLUTION, SNOW IMPURITIES, RUN-OFF, MELTWATER, WATER POLLUTION, SNOW MELTING, FREEZE THAW CYCLES, SOLUBILITY, SNOW DEPTH.

SOLUBILITY, SNOW DEPTH.

The soluble impurities contained in a snow cover can be concentrated as much as five fold in the first fractions of snowmelt runoff. In addition, daily impurities in the lower portion of the snow cover, hence preparing the impurities for rapid removal. Bavironamental damage can occur due to the concentration and rapid release of ascid precipitation. The enrow, especially in areas of "acid precipitation." The enrichment of the soluble impurities is explained and the results of laboratory experiments are given.

MP 1488

TESTS OF FRAZIL COLLECTOR LINES TO ASSIST ICE COVER FORMATION.

Perham, R.E., Canadian journal of civil engineering, Dec. 1981, 8(4), p.442-448, With Prench summary.

36-1866

PRAZIL ICE, ICE FORMATION, ICE ACCRETION, ICE GROWTH, WATER FLOW, ICE COVER STRENGTH, RIVER ICE, NUCLATING AGENTS, ICE BOOMS.

AGENTS, ICE BOOMS.

A preliminary investigation was made of the effect of frazil ice on arrays of lines positioned in flowing water under winter conditions. It was found that the lines would provide a stable basis for forming an ice cover on many stream reaches that would normally remain open because of high velocity and shallow depths.

Tests were conducted in a refrigerated flume and in small mountain rivers. Plume depths varied from 2-22 cm and river depths varied from 2-22 cm and river depths varied from 2-0.04 m/s in the flume and a range of 0.6-0.8 m/s in the rivers. Prazil ice would grow on a line quite rapidly achieving a diameter of 32 mm in 15 min, on a 3.2 mm dia line in the flume. In the river, overnight accumulations reached 20 cm in depth. A few drag force measurements were made which yielded an average shear drag coefficient of 0.16. The results suggest methods of increasing our control over ice. control over ice.

MP 1489 ONE-DIMENSIONAL TRANSPORT FROM A HIGHLY CONCENTRATED, TRANSPER TYPE SOURCE.

O'Neill, K., International journal of heat and mass transfer, 1982, 25(1), p.27-36, With French, German and Russian summaries. 27 refs. 36-1863

HEAT TRANSFER, MASS TRANSFER, PLOW RATE, ANALYSIS (MATHEMATICS).

In both heat and mass transfer, situations arise in which an entity considered as a source/sink has strength which can only be expressed in terms of an unknown rate of source—flow field transfer. This occurs when transfer between the source and medium is driven by a dependent variable difference which is unknown, because the responding medium value is unknown. Manifold mathematical complexities arise when in addition the source is highly concentration.

ed spatially relative to the size of the overall domain. A 1-dim convective-diffusive transport equation suitable for this cause may be solved by simultaneous use of the Pourier transform and its inverse in the same equation, together with other transformation and manipulation. From the solution obtained for the case of constant source intensity, one may construct a general expression for the solution when source intensity varies arbitrarily in time. Explicit expressions are obtained for solution of the fundamental case of temporally sinusoidal source intensity.

MP 1490 SMALL CALIBER PROJECTILE PENETRA-TION IN FROZEN SOIL. Richmond, P.W., Journal of ballistics, July 1980, 4(3),

p.801-823, 11 refs. 36-1820

PROJECTILE PENETRATION, FROZE GROUND STRENGTH, IMPACT STRENGTH. FROZEN

REMOTE SENSING OF WATER QUALITY USING AN AIRBORNE SPECTRORADIOME-

McKim, H.L., et al, International Symposium on McKim, Fi.L., et al, international Symposium on Remote Sensing of the Environment, 14th, San Jose, Costa Rica, Apr. 23-30, 1980. Proceedings, 1980, p. 1353-1362, 6 refs. Merry, C.J., Layman, R.W. 36-1886

WATER CHEMISTRY, REMOTE SENSING, SUS-PENDED SEDIMENTS, SPECTROSCOPY, RADI-OMETRY, AIRBORNE EQUIPMENT.

OMETRY, AIRBORNE EQUIPMENT.

An airborne spectroradiometer with 500 parallel channels has been used to monitor water quality in various water environments. Field experiments were run to test and evaluate the instrument's response to various amounts of suspended materials in water. Procedures were evaluated in the laboratory to separate the various components from the total reflected radiance and to correlate the pectral distribution of the subsurface reflectance to the organic/inorganic materials in the water. It was concluded that qualitative and quantitative measurement of turbidity within a water body is possible using the airborne spectroradiometer. The accuracy of the quantitative measurement is still under investigation, but suspended sediment concentration of less than 3 prim can be detected. Organic and inorganic constituents can be qualitatively differentiated.

FULL-DEPTH AND GRANULAR BASE COURSE DESIGN FOR FROST AREAS.

Eaton, R.A., et al, American Society of Civil Engineers. Transportation engineering journal, Jan. 1982, 108(TE1), p.27-39, 13 refs.
Payne, J.O., Jr.

36-2091
FROST PENETRATION, SUBGRADE SOILS,
PAVEMENTS, BEARING STRENGTH, FREEZE
THAW CYCLES, FROST HEAVE, SOIL
STRENGTH, SOIL WATER, FREEZING INDEXES, DESIGN CRITERIA, DYNAMIC LOADS, DEFORMATION.

LOADS, DEFORMATION.

When properly designed and constructed, the Asphalt Institute full-depth pavement concept can be a viable design alternative for seasonal frost areas. The Corps of Engineers reduced subgrade strength frost design proved to be an upper bound or conservative design under these test conditions. For each design, two different thickneases were studied in the set sections placed over 12 in. of prepared subgrade and tested under light traffic conditions in Hanover, New Hampshire. After design traffic loading was exceeded, pavement failure occurred as expected in the thinner full-depth section. The thinner reduced subgrade strength section was still in good condition after experiencing twice its design loading. Frost penetrations, pevement n-factors (surface transfer coefficients), Benkelman Beam deflections, and the spring subgrade moisture contents are also compared for the two designs.

MP 1493 CONTINUOUSLY DEFORMING FINITE ELE-MENTS FOR THE SOLUTION OF PARABOLIC PROBLEMS, WITH AND WITHOUT PHASE

CHANGE. Lynch, D.R., et al, International journal for numerical methods in engineering, 1981, Vol.17, p.81-96, 27 refs. O'Neill, K.

36-2159 PREEZE THAW CYCLES, STEFAN PROBLEM, LIQUID SOLID INTERFACES, LATENT HEAT, BOUNDARY VALUE PROBLEMS, PHASE TRANSFORMATIONS, HEAT TRANSFER, TEMPERATURE EFFECTS, ANALYSIS (MATHEMATICS) MP 1494 APPROXIMATE SOLUTION TO NEUMANN

PROBLEM FOR SOIL SYSTEMS. Lunardini, V.J., et al, Journal of energy resources technology, Mar. 1981, 103(1), p.76-81, 12 refs. Varotta R.

Various, A.
36-2256
SOIL TEMPERATURE, HEAT BALANCE,
FREEZE THAW CYCLES, BOUNDARY LAYER,
THANSFORMATIONS, THERMAL PHASE TRANSFORMATIONS, PROPERTIES, TEMPERATURE ANALYSIS (MATHEMATICS).

ANALYSIS (MATHEMATICS).

An approximate solution to the Neumann problem has been obtained by using the heat balance integral method. The accuracy of the solution is shown to be very good for all practical soil systems cases. The thermal properties of soil systems are also expressed in terms of only the liquid volumetric fraction and combine with the approximate solution to give a rapid, accurate solution for freeze/thaw problems without using graphs, tables, or transcendental equations. A simple relation is also given for the analogous problem in cylindrical coordinates, but its range of validity is somewhat limited.

ACOUSTIC EMISSIONS DURING CREEP OF FROZEN SOILS.

Fish, A.M., et al, American Society for Testing and Materials. Special technical publication, 1982, No.750, p.194-206, 18 refs. Sayles, F.H.

GROUND PHYSICS, FROZEN GROUND STRENGTH, SOIL CREEP, ACOUSTICS, RHEOLOGY, STRESSES, COMPRESSIVE PROPERTIES, SOIL FREEZING, DEFORMA-

TION.

Deformation, time-dependent failure, and acoustic emissions during unconfined compression tests of frozen Fairbanks silt were studied. Acoustic emissions (AE) are detected when the applied stress exceeds a threshold level. This threshold stress is related to the limit of long-term strength of the frozen soil. Under stress exceeding the limit of the long-term strength, the accumulation of acoustic emissions with time can be correlated with creep deformation; that is, plots of the cumulative number of acoustic pulses versus time have shapes similar to those of creep curves with primary, secondary, and tertiary stages. Such correspondence made it possible to describe both phenomena from the viewpoint of the unified kinetic theory of strength. Experimental data are presented, and unified constitutive equations describing deformations, time-dependent failure, and the accumulation of the acoustic emissions during short-term creep of frozen soils are derived. The time to incipient failure, when the AE rate reaches a minimum, is considered to be the most important characteristic of a creep process. It is shown that this time can be predicted theoretically if the parameters of the AB process and the stress state of the frozen soil are known.

MP 1496

MP 1496 PHASE CHANGE AROUND INSULATED BU-

RIED PIPES: QUASI-STEADY METHOD. Lunardini, V.J., Journal of energy resources technology, Sep. 1981, Vol.103, p.201-207, 13 refs. 36-2401

FREEZE THAW TESTS, UNDERGROUND PIPE-LINES, HEAT TRANSFER, STEFAN PROBLEM, PHASE TRANSFORMATIONS, PIPELINE INSU-THERMAL INSULATION, ANALYSIS (MATHEMATICS).

The heat transfer problem for cylinders embedded in a medium with variable thermal properties cannot be solved excatly if phase change occurs. Approximate solutions have been found using the quasi-steady method. The temperature field, phase change location, and pipe surface heat transfer can be estimated using graphs presented for parametric ranges of temperature, thermal properties, burial depth, and insulation thickness. The accuracy of the graphs increases as the Stefan number decreases and they should be of particular value for insulated hot pipes or refrigerated gas lines.

HIGHLY EFFICIENT, OSCILLATION FREE SO-LUTION OF THE TRANSPORT EQUATION OVER LONG TIMES AND LARGE SPACES. O'Neill, K., Water resources research, Dec. 1981, 17(6), p.1665-1675, 28 refs. 36-2428

SOLUTIONS, FLUID FLOW, DIFFUSION, CON-VECTION, TIME FACTOR, ANALYSIS (MATH-EMATICS).

VENTING OF BUILT-UP ROOFING SYSTEMS. Tobiasson, W., Conference on Roofing Technology, 6th, Gaithersburg, MD, Apr. 30-May I, 1981. Proceedings, 1981, p.16-21, 12 refs. 38-3981

ROOFS, VENTILATION, THERMAL INSULA-TION, MOISTURE, DRYING, DRAINS, VAPOR

Table 1 summarizes the information presented in this paper. The following rules of thumb are offered: 1. Bituminous built-up membranes should be vented during construction to allow excess moisture to dissipate. 2. Do not rely on venting above wet-applied decks or wet-applied insulations to dry them. 3. Allow wet-applied decks and wet-applied insulations to dry into the space below. 4. To make roofing systems less vulnerable to moisture problems avoid using moisture-sensitive materials for the bottom ply of a membrane. 5. There is no reason to vent the insulation of a roof lacking a vapor retarder. In fact, venting such roofs may do more thermal and moistitu- harm than good. 6. When a vapor retarder is required, focus money and efforts that might be spent on vents to improving the quality of the vapor retarder. 7. Do not expect to be able to encapsulate insulation in a vapor tight, pressurizable envelope. Consequently, do not worry too much shout creating excess pressures within the roofing system (except within the membrane itself). 8. Do not expect to be able to dry out wet insulation in compact roofs by venting. 9. Some drying of wet fibrous glass insulation is possible by draining away water.

MP 1499
CRREL FROST HEAVE TEST, USA.
Chamberlain, E.J., et al, Frost i jord, Nov. 1981, No.22, p.55-62, 7 refs.
Carbee, D.L.

36-2480

FROST RESISTANCE, SOIL FREEZING, FROST HEAVE, MEASURING INSTRUMENTS, TEM-PERATURE EFFECTS, TESTS.

PERATURE EFFECTS, TESTS.

The CRREL frost heave test for determining the frost susceptibility of soils and granular base materials is described. The CRREL test is conducted with a constant rate of frost penetration of 1.3 cm/day with water freely availale. The frost susceptibility classification system is based on the average rate of heave for 12 days. A summary of nearty 400 tests is given to show the wide range of results for similar materials. A summary of the U.S. Army Corps of Engineers Prost Design Classification System is also given to show for what materials the frost heave test is required.

OVERVIEW OF SEASONAL SNOW METAMOR-

Colbeck, S.C., Reviews of geophysics and space physics, Feb. 1982, 20(1), p.45-61, 43 refs., Presented at the U.S.-Canadian Workshop on the Properties of Snow, Snowbird, Utah, April 8-10, 1981.

SNOW PHYSICS, METAMORPHISM (SNOW), SNOW COVER STRUCTURE, SNOW WATER CONTENT.

CONTENT.

The grains in seasonal anow undergo rapid and radical transformations in size, shape, and cohesion. These grain characteristics affect all of the basis properties of anow. Snow is characterized as either wet or dry depending on the presence of liquid water. Wet snow is markedly different at low and high liquid contents. Dry snow is characterized as either an equilibrium form or a kinetic growth form; that is, it is either well rounded or faceted. Of course, many snow grains display either transitional features between two of these categories or features which arise from other processes. Snow is classified depending on the dominant processes of its metamorphism.

MP 1501

PREDICTION OF ICE GROWTH AND CIRCU-LATION IN KACHEMAK BAY, BRADLEY LAKE HYDROELECTRIC PROJECT.

Daly, S.F., Bradley Lake Hydreolectric Project, Alaska; environmental impact statement—Appendixes. Anchorage, U.S. Army Corps of Engineers, March 1982, p.(C)1-(C)9.
36-2575

36-2575
ICE GROWTH, OCEAN CURRENTS, SEA ICE
DISTRIBUTION, ENVIRONMENTAL IMPACT,
ELECTRIC POWER, SUSPENDED SEDIMENTS,
UNITED STATES—ALASKA—KACHEMAK

HISTORICAL SHORELINE CHANGES ALONG THE OUTER COAST OF CAPE COD.

Gatto, L.W., Environmental geologic guide to Cape Cod National Seashore. Edited by S.P. Leatherman, Amherst, University of Massachusetts, 1979, p.69-90, 9 refs. 36-2573

SHORELINE MODIFICATION, SHORE ERO-SION, PHOTOINTERPRETATION, WATER LEV-EL, AERIAL SURVEYS, HISTORY.

EL, AERIAL SURVEYS, HISTORY.

The objectives of this investigation were to analyze past patterns of shoreline change, estimate the amounts of change in the positions of the high water line and sea cliff break and base, and estimate rates of accretion and erosion. Distances from selected reference points to the high water line, cliff break, and cliff base were measured using photointerpretation techniques on black and white 9 x 9 in serial photographs acquired in 1938, 1952, 1971 and 1974. The amounts and rates of change are calculated for the intervals between the dates of photo acquisition and for the total period from 1938 to 1974.

MP 1503

HISTORICAL SHORELINE CHANGES AS DE-TERMINED FROM AERIAL PHOTOINTER-PRETATION.

Gatto, L.W., Remote Sensing Symposium, Reston, Va., Oct. 29-31, 1979. Proceedings. U.S. Army Corps of Engineers, t1980, p.167-170.

SHORELINE MODIFICATION, SHORE ERO-SION, PHOTOINTERPRETATION, AERIAL SURVEYS, PHOTOGRAMMETRY. AERIAL

SURVEYS, PHOTOGRAMMETRY.

The protection and preservation of shorelines and coastal areas along oceans, lakes, reservoirs and rivers have become increasingly important with more intensive use and development of these areas by the growing population. Shoreline crossion and subsequent shoreline recession are of primary concern since they cause property loss, changes in shoreline habitats and degraded water quality. USACRREL has been investigating many of the complex erosion processes, site spec for rates of erosion and problems caused by shoreline erosion. As an integral part of these comprehensive investigations, historical and recent serial photographs have been used to document historical shoreline characteristics and conditions, to determine past patterns of regional shoreline changes, to monitor the areal extent of shoreline erosion, and to estimate the historical rates of change in shoreline positions.

POTHOLES: THE PROBLEM AND SOLU-

Eaton, R.A., *Military engineer*, Apr. 1982, 74(479), p.160-162. 36-3938 PAVEMENTS, DAMAGE, ROAD MAINTE-

30-3938 PAVEMENTS, DAMAGE, ROAD MAINTE-NANCE, FREEZE THAW CYCLES, DRAINAGE, FROST HEAVE, FATIGUE (MATERIALS), PRECIPITATION (METEOROLOGY), CRACKS.

MP 1505

ROOF MOISTURE SURVEYS.

Tobiasson, W., Military engineer, Apr. 1982, 47(479), p.163-166, 4 refs. 36-4011

ROOFS, WATERPROOFING, MOISTURE DE-TECTION, DRAINAGE, INFRARED PHOTOG-RAPHY, LEAKAGE.

MP 1506

MP 1906
OVERLAND FLOW: AN ALTERNATIVE FOR
WASTEWATER TREATMENT.
Martel, C.J., et al, Military engineer, Apr. 1982,
47(479), p.181-184, 6 refs.
Lee, C.R.

WASTE TREATMENT, WATER TREATMENT, RUNOFF, LAND RECLAMATION, SLOPE ORIENTATION.

PHASE CHANGE AROUND A CIRCULAR CYL-INDER.

Lunardini, V.J., Journal of heat transfer, Aug. 1981. 103(3), p.598-600, 14 refs. 36-2619

30-2019
PHASE TRANSFORMATIONS, PIPES (TUBES),
HEAT TRANSFER, FREEZE THAW CYCLES,
FROZEN GROUND PHYSICS, BOUNDARY
LAYER, HEAT BALANCE, ANALYSIS (MATH-EMATICS).

MP 1508

MP 1508
MAINTAINING BUILDINGS IN THE ARCTIC.
Tableson W et al. Batiment international. Building Tobiasson, W., et al, Batiment international. Building research and practice, July-Aug. 1977, 5(4), p.244-251, In English and French.
Flanders, S.N., Korhonen, C.

36-2638

36-2638
THERMAL INSULATION, BUILDINGS, HEAT
TRANSFER, MOISTURE TRANSFER, MAINTENANCE, UREA, LEAKAGE, INFRARED PHOTOGRAPHY, UNITED STATES—ALASKA.
Close interest in the work of CIB working commission W
40 on heat and moisture transfer has prompted the authors,
who are scientists working with the US Army Cold Regions
Research and Engineering Laboratory, to send us these two
summaries of remedial work on houses in Alaska. The
first indicates the scope for simple injection of urea formaldehyde feam to improve thermal insulation of old wood-frame
buildings; the second shows how infra-red photography can
cut the cost of repairs to leaking roofs.

MP 1509

CAN WET ROOF INSULATION BE DRIED OUT. Tobiasson, W., et al, Thermal insulation materials and systems for energy conservation in the '80s, edited by F.A. Govan, D.M. Greaon and J.D. McAllister, Philadelphia, American Society for Testing and Materials, 1983, p.626-639, ASTM STP 789, 11 refs. Korhonen, C., Coutermarsh, B.A., Greatorex, A. 29, 2089.

38-3980 ROOFS, THERMAL INSULATION, MOISTURE, DRYING, VENTILATION, VAPOR BARRIERS.

DRYING, VENTILATION, VAPOR BARRIERS.

Nondestructive techniques are being widely used to locate wet insulation in compact roofing systems. Now that wet insulation can be found, breather vents and so-called 'breathable' membranes are being promoted to dry out wet insulation, thereby recovering its thermal effectiveness. Our exposure tests in New Hampshire indicate that the above venting methods are all rather ineffective in drying sealed specimens of pertite and fibrous glass roof insulation. It would take many decades to dry our specimens at the rate we measured over the past two years. Cross-ventilation within the insulation increased the rate of drying. For peritie insulation, the faster rate would still result in a drying time measured in decades. For fibrous glass insulation, the drying time was reduced to 13 years. We have succeed in drying fibrous glass insulation in a roof by removing the water with a vacuum cleaner.

MAP 1510

MP 1510

MP 1510
SNOW COVER MAPPING IN NORTHERN
MAINE USING LANDSAT DIGITAL PROCESSING TECHNIQUES.
Merry, C.J., et al, Satellite hydrology. Annual Wiliam T. Pecora Memorial Symposium, 5th, American
Water Resources Association, June 1979, p.197-198, Summary only.

McKim, H.L., Bates, R.E., Ungar, S.G., Cooper, S.,
Power, J.M.

36-2843 VEGETATION, SNOW COVER DISTRIBUTION, SNOW WATER EQUIVALENT, SNOW DEPTH, MAPPING, LANDSAT.

MP 1511 VEGETATION SELECTION AND MANAGE-MENT FOR OVERLAND FLOW SYSTEMS.

Palazzo, A.J., et al. Land treatment of municipal wastewater. Edited by F.M. D'Itri, Sevenoaks, England, Butterworths, 1982, p.135-154, 19 refs.

Jenkins, T.F., Martel, C.J.

WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, VEGETATION, GROWTH, NUTRIENT CYCLE, AGRICULTURE.

MP 1512 CONFIGURATION OF ICE IN FROZEN MEDIA.

Colbeck, S.C., Soil science, Feb. 1982, 133(2), p.116-123, 9 refs. 36-2865

30-2865 ICE CRYSTAL STRUCTURE, ICE CRYSTAL GROWTH, GROUND ICE, SANDS, ICE AIR IN-TERFACE, POROSITY, WATER CONTENT, HEAT TRANSFER, MASS FLOW, EXPERIMEN-

TATION.

The configuration and fabrics of ice in frozen glass beads and sands with a low initial water content were observed. As suggested by Miller, the air-ice interface is convex, and pores seem to fill unstably. This produces an uneven ice distribution when the water supply is limited. Many different ice shapes and crystal distributions were observed, indicating a mixture of kinetic crystal growth processes and equilibrium constraints. Ice dendrites arose from rapid growth.

Both single and multicrystalline structures were found. Clearly, a wide variety of situations is possible, depending on growth rates, nucleation sites, and local paths of heat and mass flow.

MP 1513 SOME FIELD STUDIES OF THE CORRELA-TION BETWEEN ELECTROMAGNETIC AND DIRECT CURRENT MEASUREMENTS OF GROUND RESISTIVITY.

Arcone, S.A., American Society for Testing and Materials. Special technical publication, 1982, No.741, p.92-110, 11 refs.

36-2748

36-2748
SOIL PHYSICS, ELECTRICAL RESISTIVITY, ELECTROMAGNETIC PROSPECTING, PERMA-FROST PHYSICS, MAGNETIC SURVEYS, ELECTRIC FIELDS, GROUND ICE.

TRIC FIELDS, GROUND ICE.

Electromagnetic (em) and direct-current (d-c) methods of measuring ground resistivity have been compared at permafrost and nonpermafrost sites. The em methods utilized the principles of magnetic induction and plane wave surface impedance. Layered ground models were derived from the d-c sounding data, and the theoretical values of the em methods for these models were compared with the em field results. Both em methods correlated well with the control of large extent. In several cases of resistive inhomogeneities,

the magnetic induction data correlated well with the de data. In one case of a resistive inhomogeneity, the surface impedance responded well only qualitatively and may have given some false indications of resistive substructure. have given some false indications of resistive substructure. It appears that in all cases where the volume of exploration was comparable, there was reasonable correlation. It is estimated that the standard data analysis procedure which assumes layering of infinite extent will apply well for the surface impedance method when disturbances in the local layering are greater than a skin depth away from the point of measurement; and for the magnetic induction method when disturbances in the layering are at a distance from the interloop axis that is greater than the interloop separation.

MULTI-YEAR PRESSURE RIDGES IN THE CANADIAN BEAUFORT SEA

Wright, B., et al, Coastal engineering, Oct. 1981, 5(2/3), p.125-145, For another source of the article and abstract see 33-4609 (MP 1229). 16 refs.

36-3745 SEA ICE, PRESSURE RIDGES, ICE STRUCTURE, MODELS

MP 1515

DESIGN AND USE OF THE CRREL INSTRU-MENTED VEHICLE FOR COLD REGIONS MO-BILITY MEASUREMENTS. Blaisdell, G.L., SAB technical paper series, 1982,

No.820217, International Congress and Exposition, Detroit, Michigan, Feb.22-26, 1982, 11p., 2 refs. 36-2755

TRACTION, COLD WEATHER OPERATION, TIRES, SURFACE PROPERTIES, RUBBER SNOW FRICTION, INTERFACES, VEHICLES, TESTS, COMPUTER APPLICATIONS.

COMPUTER APPLICATIONS.

The U.S. Army Cold Regions Research and Rugineering Laboratory has recently acquired an instrumented vehicle for the measurement of forces at the tire/surface material interface. The CREL instrumented vehicle (CTV) is equipped with moment-compensated triaxial load cells mounted in the front wheel assemblies. Forces are measured in the vertical, longitudinal (in the direction of motion) and side directions. In addition, accurate wheel and vehicle speeds and rear axle torque and speed are measured. Modifications to the vehicle to facilitate the performance of traction and motion resistance tests include four lock-out type hubs to allow front, rear- or four-wheel drive and a dual brake system for front-, rear- or four-wheel braking. A minicomputer-based data acquisition system is installed in the vehicle to control data collection and for data processing, analysis, and display. Discussion of the vehicle includes its operation and use for the evaluation of the tire performance and surface material properties of motion resistance and traction.

MP 1816

MP 1516 MEASUREMENT OF SNOW SURFACES AND

TIRE PERFORMANCE EVALUATION.
Blaisdell, G.L., et al, SAB technical paper series, 1982,
No.820346, International Congress and Exposition,
Detroit, Michigan, Feb. 22-26, 1981, 7p., 8 refs. Harrison, W.L.

RUBBER SNOW FRICTION, SNOW SURFACE, TRACTION, VEHICLES, ANALYSIS (MATH-EMATICS).

EMATICS). Research on vehicle mobility in snow has recently become significantly updated by the use of instrumented vehicles. Utilizing triaxial load cells in the front wheel assemblies, the vehicles are capable of measuring the traction and motion resistance forces located at the tire/snow interface. Based on these measured quantities, snow surface characterization parameters are developed. Also, using an energetics approach, a tire performance parameter is developed which offers a measure of the slip-shear energy expended by a tire moving a unit distance. This paper presents the methods, equipment and philosophy followed by the authors in evaluating tire performance in a shallow snow cover. Definitions of terms are contained in the Appendix.

ON THE DIFFERENCES IN ABLATION SEA-SONS OF ARCTIC AND ANTARCTIC SEA ICE. Andreas, E.L., et al, Journal of the atmospheric sciences, Feb. 1982, 39(2), p.440-447, 41 refs.

Ackley, S.F. 36-2836

36-2836
SEA ICE, ICE MELTING, ABLATION, METEOROLOGICAL FACTORS.
Arctic sea ice is freckled with melt ponds during the ablation season; Antarctic sea ice has few, if any. On the basis of a simple surface heat budget, the authors investigate the meteorological conditions necessary for the onset of surface melting in an attempt to explain these observations. The low relative humidity associated with the relatively dry winds off the continent and an effective radiation parameter smaller than that characteristic of the Arctic are primarily responsible for the absence of melt features in the Antarctic. Together these require a surface-layer air temperature above OC before Antarctic sea ice can melt. A ratio of the bulk transfer coefficients less than 1 slac contributes to the dissimilarity in Arctic and Antarctic ablation seasons. The effects of wind speed and of the sea-ice roughness

on the absolute values of bulk transfer coefficients seem to moderate regional differences, but final assessment of this hypothesis awaits better data, especially from the Antarctic. (Auth.)

MP 1518

SEDIMENT LOAD AND CHANNEL CHARAC-TERISTICS IN SUBARCTIC UPLAND CATCH-

Slaughter, C.W., et al, Journal of hydrology (New Zealand), 1981, 20(1), p.39-48, 12 refs. Collina, C.M.

36-2830

36-2830
DISCONTINUOUS PERMAFROST, CHANNELS
(WATERWAYS), GEOMORPHOLOGY, SEDIMENT TRANSPORT, HYDROLOGY, DRAINAGE, SUSPENDED SEDIMENTS, WATERSHEDS, STATISTICAL ANALYSIS.

SHEDS, STATISTICAL ANALYSIS.
Sediment load in low-order streams of the unglaciated Yukon-Tanuna Uplands of central Alaska may be related to drainage basin characteristics and to stream channel morphology. This has been investigated by analysis of selected physical hydrological and water quality data for the 104 sq km Caribon-Poker Creeks Research Watershed, located at 65 deg, 09 min N, 147 deg, 30 min W in a region of rolling to steep uplands and discontinuous permatirost. Channel morphology data are available for first-, second- and third-order streams. Sediment load for selected points was determined over 45 weeks during summer of 1978 and 1979. Consistent differences in sediment yield, hydrologic regime and channel morphology have been determined between permafrost and non-permafrost drainages.

MP 1519

ROLE OF RESEARCH IN DEVELOPING SURFACE PROTECTION MEASURES FOR THE
ARCTIC SLOPE OF ALASKA.
Johnson, P.R., Symposium: Surface Protection
through Prevention of Damage (Surface Management); Focus: The Arctic Slope, Anchorage, Alaska,
May 17-20, 1977. Proceedings. Edited by M.N.
Evans. Anchorage, Alaska State Office, Bureau of
Land Management, Mar. 1978, p.202-205.
36-2855

SNOW ACCUMULATION, ENVIRONMENTAL PROTECTION, SNOW ROADS, ICE ROADS, SNOWDRIFTS, WIND FACTORS, SNOW FENCES, UNITED STATES—ALASKA—NORTH

SLOPE.

The U.S. Army Cold Regions Research and Engineering Laboratory (USA CRREL) has long conducted research in snow, ice, and permafrost. It also translates foreign language engineering papers and publishes research reports, monographs, and bibliographies. Snow and ice roads and construction pads have been used, primarily on the Arctic Slope, during the last few winters. Some have been successful but problems exist which will require further experience and research to solve. One problem is that of snow supply. Snowfall on the Arctic Slope is limited, particularly early in the season when it is most desired. Pew good data are available on total quantities and the time pattern of snowfall but Wyoming Snow Gages, now being installed by a number of government agencies and private organizations, are beginning to provide some data which can be used with some confidence. The snow which falls is often blown off by the strong winds which are common in the area so it is not available where it is needed. Research is under way on equipment and techniques for collecting snow and inducing drifting.

GROUND PRESSURES EXERTED BY UNDER-GROUND EXPLOSIONS.

GROUND EXPLOSIONS.
Johnson, P.R., Symposium: Surface Protection
through Prevention of Damage (Surface Management); Focus: The Arctic Slope, Anchorage, Alaska,
May 17-20, 1977. Proceedings. Edited by M.N.
Evans, Anchorage, Alaska State Office, Bureau of
Land Management, Mar. 1978, p.284-290, 3 refs.
36-2857 36-2857

30-257/
PROZEN GROUND STRENGTH, ENVIRONMENTAL PROTECTION, SOIL PRESSURE, EXPLOSION EFFECTS, SHOCK WAVES, WAVE
PROPAGATION, ENVIRONMENTAL IMPACT,
BLASTING, MARINE BIOLOGY, UNITED
STATES—ALASKA—NORTH SLOPE.

STATES—ALASKA—NORTH SLOPE.

Peak shock pressures in frozen soil resulting from underground explosions of moderate size and their effect on fish populations are examined, based on current knowledge of shock pressure patterns and the sensitivity of fish eggs and young and adult fish to such pressures. The peak shock pressures attenuate rapidly with distance from explosions and it appears that moderate-sized explosions, such as those from standard sciamic shots, can be fired within a few hundred feet of water bodies without exceeding allowable peak shock pressures in the water bodies. Experimental studies should be carried out to confirm the pattern of peak shock pressure attenuation and examine the effectiveness of shock transmission between frozen ground and the water bodies.

MP 1521

USING SEA ICE TO MEASURE VERTICAL HEAT FLUX IN THE OCEAN.

McPhee, M.G., et al, Journal of geophysical research, Mar. 20, 1982, 87(C3), p.2071-2074, 8 refs. Untersteiner, N.

36-2868

36-2865
SEA ICE, ICE SALINITY, HEAT FLUX, SEA WATER, TEMPERATURE GRADIENTS, ICE GROWTH, DRIFTING STATIONS, WATER TEMPERATURE, SALINITY.

Results of an experiment performed at drifting ice station FRAM I in the Arctic Ocean northwest of Spitzbergen during March-May 1979 indicate that sensible heat flux from the ocean to the ice cover was less than 2 W/sq.m. The estimate is based on measurements of temperature gradient, growth rate, and salinity of young sea ice. Uncertainty in the magnitude of the heat flux results more from evidence of horizontal inhomogeneity in the growing ice sheet than from measurement errors.

MP 1522

APPROACH ROADS, GREENLAND 1955 PRO-

U.S. Arctic Construction and Frost Effects Laboratory, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. Technical report, June 1959, No.3-505, 100p., For preliminary version see ACFEL TR 60, or 25-2537. 36-2877

36-2877
PERMAFROST BENEATH ROADS, PERMAFROST THERMAL PROPERTIES, GLACIER
FLOW, GLACIER MELTING, ROADS, MAINTENANCE, THAW DEPTH, MELTWATER, ICE
TEMPERATURE, ROADBEDS, CONSTRUCTION, GRAVEL, EQUIPMENT, GREENLAND—
CAMP TUTO.

MP 1523

BASELINE DATA ON TIDAL FLUSHING IN

COOK INLET, ALASKA.
Gatto, L.W., Preliminary analysis report, SR/T contract No.160-75-89-02-10, June 1973, 11p., Unpublished manuscript. 9 refs.

JO-20/6
TIDAL CURRENTS, SUSPENDED SEDIMENTS, OCEAN CURRENTS, WATER POLLUTION, SEDIMENT TRANSPORT, SEDIMENTATION, REMOTE SENSING, SEASONAL VARIATIONS, UNITED STATES—ALASKA—COOK INLET.

36-2870

MP 1524 ACOUSTIC EMISSIONS FROM POLYCRYS-

TALLINE ICE.

St. Lawrence, W.F., et al, Cold regions science and technology, Mar. 1982, 5(3), p.183-199, 18 refs.

Cole, D.M.

36-28/0
ICE CRYSTAL STRUCTURE, ICE ACOUSTICS, DYNAMIC LOADS, STRESSES, STRAINS, FRACTURING, AIR TEMPERATURE, MATHEMATICAL MODELS, MECHANICAL TESTS.

EMATICAL MODELS, MECHANICAL TESTS.
The acoustic emission response from fine-grained polycrystalline ice subjected to constant compressive loads was examined.
A number of tests were conducted with the nominal stress
ranging from 0.8 to 3.67 MPa at a temperature of -5C.
The acoustic emission response was recorded and the data
are presented with respect to time and strain. The source
of acoustic emissions in ice is considered in terms of the
formation of both microfractures and visible fractures that
develop without catastrophic failure of the ice. A model
to describe the acoustic emission response is developed.

MP 1525

DEFORMATION AND FAILURE OF ICE UNDER CONSTANT STRESS OR CONSTANT STRAIN-RATE.

Mellor, M., et al. Cold regions science and technology, Mar. 1982, 5(3), p.201-219, 8 refs. D.M.

36-2871

ICE DEFORMATION, STRESS STRAIN DIA-GRAMS, ICE MECHANICS, AIR TEMPERA-TURE, TESTS, ISOTOPES.

Fine-grained isotopic ice was tested in uniaxial compression at -5C. Tests were made under: 1. Constant strain rate, and 2. Constant stress, with total axial strains up to about 7%. Direct comparison of the results for constant stress and constant strain rate suggests that the two tests give much the same information when interpreted suitably. Detailed comparisons and interpretations of the data will be given in a subsequent paper.

MP 1526 ON MODELING MESOSCALE ICE DYNAMICS USING A VISCOUS PLASTIC CONSTITUTIVE

Hibler, W.D., III, et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 6th, Québec, Canada, July 27-31, 1981. Proceedings, Vol.3, Québec, Canada, Université Laval, 1981, p.1317-1329, 9 refs. Includes discussion and authors reply. Udin, I., Ullerstig, A.

36-2982 ICE MECHANICS, VISCOSITY, ICE PLASTICI-TY, RHEOLOGY, MATHEMATICAL MODELS, PLASTIC FLOW, ICE COVER THICKNESS, VELOCITY, ICE STRENGTH.

VELOCITY, ICE STRENGTH.

The behavior of an ice dynamics model employing a viscous plastic rheology is investigated. Time and space scales of the order of 3 hours and 20 km are emphasized. However, whenever possible the results are presented in a nondimensional form. Numerical parameter variations examined include the effect of the "rigid" creep rate on numerical convergence rate, the effects of ice strength on the numerical adjustment time needed to fully attain ideal plastic flow, and the effect of grid size on the behavior of simulated ice dynamics. Based on the results of these studies a viable numerical procedure for simulating mesoscale plastic flow is proposed.

MP 1527

SEA ICE RUBBLE FORMATIONS OFF THE NORTHEAST BERING SEA AND NORTON SOUND COASTS OF ALASKA.

Kovacs, A., International Conference on Port and Ocean Engineering under Arctic Conditions, 6th, Québec, Canada, July 27-31, 1981. Proceedings, Vol.3, Québec, Canada, Université Laval, 1981, p.1348-1363, 21 refs. 36-2984

36-2984
SEA ICE, PRESSURE RIDGES, ICE SURFACE, ICE FORMATION, GROUNDED ICE, PHOTOGRAPHY, AERIAL SURVEYS, UNITED STATES—ALASKA—NORTON SOUND, BERING SEA.

MP 1528

RIVER ICE SUPPRESSION BY SIDE CHANNEL DISCHARGE OF WARM WATER.

Ashton, G.D., IAHR International Symposium on lee,

Québec, Canada, July 27-31, 1981. Proceedings, Vol.1, Québec, Canada, Université Laval, 1982, p.65-80, 3 refs. Includes discussions and replies. 36-3023

TEMPERATURE, ICE CONDITIONS, ICE PREVENTION, CHANNELS (WATERWAYS), WATER TEMPERATURE, RIVER FLOW, ICE EDGE, AIR TEMPERATURE, ICE MELTING.

TEMPERATURE, ICE MELTING.

Results are presented of a field study of the ice suppression caused by discharge of warm water at the side of the Mississippi River near Bettemdorf, lows. Included in the results are measurements of lateral and longitudinal open water extents and lateral, longitudinal, and vertical water temperature profiles. Successive measurements were made on both very cold (-20°C) and warm days (0°C air temperature). The manner by which the ice cover extends during a change from warm to cold weather is described.

PERFORMANCE OF A POINT SOURCE BUB-BLER UNDER THICK ICE.

Haynes, F.D., et al, IAHR International Symposium nagues, r.D., et al, IAHK International Symposium on Ice, Québec, Canada, July 27-31, 1981. Proceedings, Vol.1, Québec, Canada, Université Laval, 1982, p.111-124, 10 refs. Includes discussions and replies. Ashton, G.D., Johnson, P.R.

ICE COVER THICKNESS, BUBBLING, ICE PRE-VENTION, ICE MELTING, STRUCTURES, DAM-AGE, TESTS, AIR TEMPERATURE, ANALYSIS (MATHEMATICS).

(MATHEMATICS).

Air bubbler systems are used to suppress ice formation and prevent ice damage to structures. Injection of air into the slightly more dense, warm water at the bottom of a body of fresh water raises the warm water to the surface. A bubbler system provides a simple and inexpensive means of suppressing ice if the body of water has the necessary thermal reserve. A study was conducted with a point source bubbler to examine its performance when installed under an existing layer of thick lake ice.

MP 1530

PORT HURON ICE CONTROL MODEL STUD-

Calkins, D.J., et al, IAHR International Symposium on Ice, Québec, Canada, July 27-31, 1981. Proceedings, Vol.1, Québec, Canada, Université Laval, 1982, p.361-373, 6 refs. Includes discussion and authors' reply. 373, 6 refs. Includes d Sodhi, D.S., Deck, D.S.

36-304
RIVER ICE, ICE CONTROL, ICE JAMS, FLOODS, ICE MECHANICS, LAKE ICE, ICE LOADS, LOADS (FORCES), ICE FLOES, WIND PRESSURE, STRUCTURES, MODELS, UNITED STATES—SAINT CLAIR RIVER.

The Corps of Engineers, in its study of year-round navigation on the Great Lakes, recognized the problem of ice discharge into St. Clair River from Lake Huron. This study deals with the determination of force levels on, and the amount of ice discharge through the opening in, an ice control structure, using natural and synthetic ice floes.

MP 1531

FORCE DISTRIBUTION IN A FRAGMENTED ICE COVER.

ICE COVER.

Daly, S.F., et al, IAHR International Symposium on Ice, Québec, Canada, July 27-31, 1981. Proceedings, Vol.1, Québec, Canada, Université Laval, 1982, p. 374-387, 2 reh. Includes discussions and authors' replies. Stewart, D.M.

FLOATING ICE, ICE FLOES, LOADS (FORCES), ICE BOOMS, SHEAR STRESS, CHANNELS (WA-TERWAYS), EXPERIMENTATION.

MP 1532

GLACIER MECHANICS.

Mellor, M., IAHR International Symposium on Ice, Québec, Canada, July 27-31, 1981. Proceedings, Vol.2, Québec, Canada, Université Laval, 1982, p.455-474. Includes discussion.

34-3051 GLACIER FLOW, ICE CREEP, ICE MECHANICS, STRESS STRAIN DIAGRAMS, RHEOLOGY, EN-GINEERING.

MP 1533

FIELD INVESTIGATIONS OF A HANGING ICE DAM.

Beltace, S., et al, IAHR International Symposium on Ice, Québec, Canada, July 27-31, 1981. Proceedings, Vol.2, Québec, Canada, Université I. sval, 1982, p.475-488, 19 refs. Includes discussions and replies.

Dean, A.M., Jr.

36-3052
RIVER ICE, ICE DAMS, ICE BREAKUP, FRAZIL
ICE, SHEAR STRENGTH, UNDERWATER ICE,
SLUSH, BEARING STRENGTH, ICE JAMS,
DAMAGE, FLOW RATE, POROSITY.

DAMAGE, FLOW RATE, POROSITY.

A hanging ice dam that forms annually in the lower Smoky River, Alberta, has been the object of continued investigation during the period 1975-1979. The study aims at documenting physical dimensions and material properties of the dan; and assessing its effects on the progress of breakup in the river. This paper presents a summary of the results obtained to date.

MP 1534

PROBABILISTIC-DETERMINISTIC ANALYSIS OF ONE-DIMENSIONAL ICE SEGREGATION IN A FREEZING SOIL COLUMN.

Guymon, G.L., et al, Cold regions science and technology, Nov. 1981, 5(2), p.127-140, 14 refs. Harr, M.E., Berg, R.L., Hromadka, T.V., II.

HATT, M.E., Berg, R.L., Hromadka, T.V., II.
36-3231
FROST HEAVE, SOIL FREEZING, HEAT
TRANSFER, SOIL WATER MIGRATION, ICE
FORMATION, WATER CONTENT, MATH-EMATICAL MODELS.

A deterministic model of frost heave based upon simultaneous analysis of coupled heat and moisture transport is cascaded with a probabilistic model of parameter variations. The multiparameter, deterministic model is based upon submodels of moisture transport, heat transport, and lumped isothermal freezing processes. The probabilistic model is based upon Rosenblueth's method which only requires knowledge of parameter means and their coefficients of variation.

MP 1535

MP 1535
APPLICATION OF A NUMERICAL SEA ICE
MODEL TO THE EAST GREENLAND AREA.
Tucker, W.B., Monterey, California, Naval Postgraduate School, Dec. 1981, 109p., M.S. thesis. Refs.

BLE SCHOOL, DEC. 1961, 107PL, WILLS. GROWTH, 36-3254
SEA ICE DISTRIBUTION, DRIFT, ICE GROWTH, THERMODYNAMICS, MATHEMATICAL MOD-ELS, GREENLAND.

A dynamic-thermodynamic sea ice model which employs a viscous-plastic constitutive law has been applied to the

Bast Greenland area. The model is run on a 40-km spatial scale at 1/4-day time steps for a 60-day period with forcing data beginning on Oct. 1, 1979. Results tend to verify that the model predicts reasonable thicknesses and velocities within the ice margin. Thermodynamic ice growth produces excessive ice extent, however, probably due to inadequate parameterization of oceanic heat flux.

ICE CRYSTAL MORPHOLOGY AND GROWTH RATES AT LOW SUPERSATURATIONS AND HIGH TEMPERATURES.

Colbeck, S.C., Journal of applied physics, May 1983, 54(5), p.2677-2682, 17 refs. 37-3607

ICE CRYSTAL STRUCTURE, ICE CRYSTAL GROWTH, SUPERSATURATION, TEMPERATURE EFFECTS, VAPOR DIFFUSION, DENSITY (MASS/VOLUME), MATHEMATICAL MODELS (MASS/VOLUME), MATHEMATICAL MODELS.
At an excess vapor density (supersaturation of about 1/10,000) adjacent to the ice crystal surface of 50-60 billionth g/cc, there is a transition between the highly faceted kinetic growth form and the rounded equilibrium form at temperatures above -6C. At lover temperatures there is a transition in the equilibrium form to hexagonal prisms because of a reduction in the disordered surface layer. The growth rate of ice crystals from the vapor is analyzed by a simple model which accounts for vapor flow and surface processes separately. The conditions for highly temperature sensitive growth are identified from the model.

MP 1538 ICE PILE-UP AND RIDE-UP ON ARCTIC AND SUBARCTIC BEACHES.

Kovaca, A., et al, Coastal engineering, Oct. 1981, 5(2/3), p.247-273, For another source of the article and abstract see 33-4610 (MP 1230). 22 refs. Sodhi, D.S.

SEA ICE, PRESSURE RIDGES, ICE PUSH.

MP 1530

FORMATION OF ICE CRYSTALS AND DISSI-PATION OF SUPERCOOLED FOG BY ARTIFI-CIAL NUCLEATION, AND VARIATIONS OF CRYSTAL HABIT AT EARLY GROWTH STAGES. Kumai, M., Journal of applied meteorology, Apr. 1982, 21(4), p.5/9-587, 14 refs.

FOG DISPERSAL, ICE CRYSTAL NUCLEI, AR-TIFICIAL NUCLEATION, SUPERCOOLED FOG, MICROSTRUCTURE, ELECTRON MICROSCOPY, PLATES, ICE FORMATION, WATER VA-POR, TEMPERATURE EFFECTS.

POR, TEMPERATURE EFFECTS.

The early stages of ice crystal formation in supercooled fogs were studied in detail by electron microscopy, and ice nucleation experiments using liquid propane seeding were conducted in a thermostatically controlled coldroom. Ice crystals, formed by rapid cooling created by the evaporation of liquid propane from a fine nozzle at temperatures from -0.1 to -40C, were collected and replicated on filmed grids for electron microscope examinations. Most of the ice crystals formed immediately after the liquid propane seedings were spherical (although approx. 20% were hexagonal) with diameters ranging from 0.3 to 3 micrometer and with a mean diameter of 1.5 micrometer. Electron microscopy revealed a grain boundary in some of the ice crystals. MP 1540

RESISTANCE COEFFICIENTS FROM VELOCI-TY PROFILES IN ICE-COVERED SHALLOW STREAMS.

Calkins, D.J., et al, Canadian journal of civil engineering, June 1982, 9(2), p.236-247, With French summary. 7 refs.

mary. 7 refs. Deck, D.S., Martinson, C.R. 36-3929

JO-37-37-37
ICE COVER STRENGTH, STREAM FLOW, VELOCITY, SHEAR STRESS, ANALYSIS (MATHEMATICS).

MP 1541 NITROGENOUS CHEMICAL COMPOSITION OF ANTARCTIC ICE AND SNOW.

Parker, B.C., ct al, Antarctic journal of the United States, 1981, 16(5), p.79-81, 10 refs. Zeller, E.J., Gow, A.J.

36-3979

JOSTON STATION, SNOW COMPOSITION, FIRN, CHEMICAL ANALYSIS, ANTARCTICA—AMUNDSEN-SCOTT STATION, ANTARCTICA—VOSTOK STATION.

—VOSTOK STATION.

This report emphasizes aitrate ion (NO3) concentrations in antarctic snow and firm from pits and cores. Chemical analyses conducted or planned on antarctic snow, firm, and cice are outlined. Computer curves compare the variation in NO3 over the past 1,000 yr in firm cores from South Pole Station and Vostok and present the NO3 concentration record for the entire Vostok core over the past 3,000 yr. South Pole firm core dates have been calculated using data which date back to 1750. Fourier analysis of the NO3 data from both South Pole and Vostok cores reveals strong periodicities in the NO3 concentration occurring at approx 11-, 22-, and 66-yr intervals. Data have previously been

reported supporting the hypothesis that the 11-yr fluctuations in NO3 either coincide with the solar activity max or the auroral max. A table lists 14 potential sources or mechanisms for NO3 in antarctic snow or firm. Solar-mediated phenomena appear to be the more likely sources. The results of NO3 sampling in a 10-m-deep snowpit are discussed.

MP 1542

PHYSICAL AND STRUCTURAL CHARACTER-ISTICS OF SEA ICE IN MCMURDO SOUND. Gow, A.J., et al, Antarctic journal of the United States, 1981, 16(5), p. 94-95, 5 refa.
Weeks, W.F., Govoni, J.W., Ackley, S.F.

36-3988

SEA ICE, ICE STRUCTURE, PHYSICAL PROPER-TIES, CALVING, ANTARCTICA-MCMURDO SOUND.

SOUND.

This season's study of the physical and structural properties of sea ice in McMurdo Sound was restricted to sea ice that had formed since Apr. 1980. Multiyear ice was observed and sampled at only one location, near Cape Chocolate on the western edge of McMurdo Sound. The locations of the sample sites are shown. The sempling program included an over-ice traverse of the bay-fast ice in McMurdo Sound. Extensive recent calving of the Koettlitz Glacier ice tongue was observed in the vicinity of the Dailey is Preliminary investigations of the crystal structure of samples from 28 locations revealed widespread formation of congelation ice but only minimal amounts of frazil ice. Formation of a sub-ice platelet layer with individual plates measuring up to several cm in length was observed at the majority of sampling sites. Petrographic studies revealed crystalline structures and e-axis orientations that exhibited much in common with shore-fast ice of the arctic coast of Alaska. common with shore-fast ice of the arctic coast of Alaska MP 1543

HIGH-RESOLUTION IMPULSE RADAR MEAS-UREMENTS FOR DETECTING SEA ICE AND CURRENT ALINEMENT UNDER THE ROSS ICE SHELF.

Morey, R.M., et al, Antarctic journal of the United States, 1981, 16(5), p.96-97, 5 refs.

Kovacs, A. 36-3989

SEA ICE, RADAR ECHOES, ICE SHELVES, AN-TARCTICA—ROSS ICE SHELF.

TARCTICA—ROSS ICE SHËLF.

The objectives of the Jan. 1981 field season were (1) to evaluate the feasibility of using a high-resolution impulse radar profiling system to detect the existence of sea ice which coring had revealed on the bottom of the Ross Ice Shelf at J-9, and 2) if successful in that effort, to try to detect the preferred horizontal C-axis azimuthal direction of the sea ice crystais using the voltage amplitude of the radar reflection. The instrumentation used is described. A table lists the radar parameters used for calculating the maximum radar range, and the maximum radar range for the two antennas used is plotted. The results obtained with the radar system were inconclusive, and several possible explanations are outlined. Brine infiltration into the McMurdo Ice Shelf was also investigated. do Ice Shelf was also investigated.

MP 1544

ROLE OF PLASTIC ICE INTERACTION IN MARGINAL ICE ZONE DYNAMICS.

Leppäranta, M., et al, Journal of geophysical research, Nov. 20, 1985, 90(C6), p.11,899-11,909, 17 refs. Hibler, W.D., III. 40-4615

ICE EDGE, SEA ICE, ICE COVER THICKNESS, PLASTIC FLOW, WIND DIRECTION, WIND VELOCITY, ICE MODELS.

VELOCITY, ICE MODELS.

Under appropriate conditions, the nonlinear nature of plastic ice interaction together with a nonlinear coupling between ice thickness characteristics and ice rheology can substantially modify the character of marginal ice zone dynamics. This paper examines the steady state ramifications of these nonlinearities by using a one-dimensional simplification of a two-level viacous plastic sea ice model. A series of idealized small-scale simulations (4-km resolution) is carried out with the model. small-scale simulations (4-km resolution) is carried out with the model formulated in a moving Lagrangian grid in order to remove diffusion effects. Analytic solutions for the equilibrium plastic adjustment case are also constructed. The results show that if the ice thickness distribution is allowed to equilibrate in response to a constant wind field, the thickness strength coupling will yield a sharp ice edge, with the compactness dropping rapidly to zero near the ice margin. (Auth. mod.)

MP 1545

GEOMETRY AND PERMITTIVITY OF SNOW

AT HIGH FREQUENCIES.
Colbeck, S.C., Journal of applied physics, June 1982, 53(6), p.4495-4500, 37 refs.
36-3921

36-3921 SNOW ELECTRICAL PROPERTIES, SNOW DENSITY, POROSITY, SNOW CRYSTAL STRUC-TURE, SNOW PHYSICS, TEMPERATURE GRADIENTS, LIQUID PHASES, WET SNOW, DIELECTRIC PROPERTIES.

The geometry and porosity of dry snow varies widely depending on the history of conditions. The permittivity of dry snow increases with increasing ice content but is not greatly affected by the shapes of the ice particles. In wet snow the permittivity increases with liquid content and the geometry is very important. However, the liquidlike layer has little

effect on permittivity. The permittivity is described using Polder and van Santen's mixing formulae and approximations of the geometries at high and low liquid contents. It is shown that the common assumption of liquid shells over ice spheres is both physically incorrect and leads to large

MP 1546

MP 1546
ENVIRONMENTAL AND SOCIETAL CONSEQUENCES OF A POSSIBLE CO2-INDUCED
CLIMATE CHANGE: VOLUME 2, PART 3—INFLUENCE OF SHORT-TERM CLIMATE FLUCTUATIONS ON PERMAFROST TERRAIN.

Brown, J., et al. U.S. Office of Buergy Research. [Report], May 1982, Vol.2, 30p., Refs. p.25-28. Andrews, J.T. 36-4051

PERMAPROST DEPTH, VEGETATION, CAR-BON DIOXIDE, CLIMATIC CHANGES, GROUND THAWING, SOIL TEMPERATURE.

DIELECTRIC PROPERTIES OF THAWED ACTIVE LAYERS OVERLYING PERMAFROST USING RADAR AT VHF.

Arcone, S.A., et al, *Radio science*, May-June 1982, 17(3), p.618-626, 17 refs.

Delancy, A.J.

DIELECTRIC PROPERTIES, ACTIVE LAYER, GROUND THAWING, PERMAFROST BASES, RADAR ECHOES.

RADAR ECHOES.
Field measurements of the dielectric constant of thawed active layers of up to 1 m in depth at four sites in Alaska have been made using short-pulse ground radar whose returns were received in the near-field radiation zone. Three sites consisted of saturated silts with varying amounts of organic material, and the fourth site was a moist sand. The reflector returning the radar signals was the active layer/permafrost interface. Analysis of the waveforms showed that all the materials were nondispersive over the radar pulse bandwidth (75-225 MHz), and this was confirmed by time domain reflectometry (TDR) studies of field samples. The average dielectric constants were between 23 and 34 for the silts, which averaged between 45 and 50% water by volume, while the sandy site gave an average value of about 12 for a probable water content of about 23% by volume. These values are very similar to the laboratory work of others and were also confirmed by TDR. The high dielectric constants of the saturated materials allowed accurate profiling of active layer depth, and an example is presented. More detail would probably be achieved with a higher-frequency radar.

MP 1548

PHYSICAL AND STRUCTURAL CHARACTER-ISTICS OF ANTARCTIC SEA ICE.

Gow, A.J., et al, Annals of glaciology, 1982, Vol.3, International Symposium on Antarctic Glaciology, 3rd, Columbus, Ohio, Sep. 7-12, 1981, p.113-117, 8

Ackley, S.F., Weeks, W.F., Govoni, J.W. 37-257

ICE FLOES, PACK ICE, FRAZIL ICE, ANTARC-TICA—WEDDELL SEA.

Observations during February and March 1980 of structures in 66 separate floes in Weddell Sea pack ice show widespread occurrence of frazil ice in amounts not previously reported in sea ice of comparable age and thickness in the Arctic. It is estimated that as much as 50% of the total ice production It is estimated that as much as 50% of the total ice production in the Weddell Sea is generated as frazil. Average floc salinities also appear higher than those of their Arctic counterparts. Comparative studies of fast ice at 28 locations in McMurdo Sound show this ice to be composed almost entirely of congelation ice that exhibits crystalline textures and orientations that are similar to those observed in Arctic fast ice. However, average fast-ice salinities in McMurdo Sound are higher than those reported for Arctic fast ice of comparable age and thickness. (Auth.)

MP 1549

ON MODELING THE WEDDELL SEA PACK

Hibler, W.D., III, et al, Annals of glaciology, 1982, Vol.3, International Symposium on Antarctic Glaciology, 3rd, Columbus, Ohio, Sep. 7-12, 1981, p.125-130, 23 refs.

Ackley, S.F. 37-259

SEA ICE, PACK ICE, THERMODYNAMIC PROP-ERTIES, ICE MODELS, ANTARCTICA—WED-

DELL SEA.

Some results from a dynamic-thermodynamic simulation of the sessonal cycle of the Weddell Sea pack ice are described. The model used for the study is similar to that developed for a numerical investigation of the Arctic ice cover. It employs a plastic ice rheology coupled to a two-level ice thickness distribution. The thickness characteristics evolve in response to ice dynamics, and to ice growth and decay rates dictated by surface heat calculations and by heat storage in a fixed depth oceanic boundary layer. Observed time-tarying wind, temperature, and humidity fields are used together with empirical radiation fields and fixed ocean currents to drive the model. Employing these fields, the model

is integrated over two seasonal cycles. Overall, the results suggest that (1) ice dynamics are essential in describing the seasonal cycle, and (2) a feedback between the atmospheric temperature and the presence of ice may be a major cause of the rapid decay of the Antarctic ice cover during the spring-summer period. (Auth. mod.)

MP 1550

BRINE ZONE IN THE MCMURDO ICE SHELF, ANTARCTICA

Kovaca, A., et al, Annals of glaciology, 1982, Vol.3, International Symposium on Antarctic Glaciology, 3rd, Columbus, Ohio, Sep. 7-12, 1981, p.166-171, 21

Gow, A.J., Cragin, J.H.

ICE SHELVES, BRINES, MIGRATION, ANTARCTICA—MCMURDO ICE SHELF.

TICA—MCMURDO ICE SHELF.
Infiltration of brine into the McMurdo Ice Shelf is dominated by wave-like intrusions of sea-water triggered by periodic break-outs of the ice front. Observations of a brine step 4.4 m in height in the McMurdo Ice Shelf show that it has migrated about 1.2 km in four years. The inland boundary of the brine percolation is probably controlled largely by the depth at which brine encounters the firn/ice transition (43 m). However, this boundary is not fixed by permeability considerations alone, since measurable movement of brine is still occurring at the inland boundary. Freeze-fractionation of the sea-water as it migrates through the ice shelf pracipitates virtually all sodium sulfate, and preferentially concomitant removal of water by freezing in the pore spaces of the infiltrated firm produces residual brines approximately seven times more concentrated than the original sea-water. (Auth. mod.)

MP 1551

NITRATE FLUCTUATIONS IN ANTARCTIC

NITIRATE PLUCTUATIONS IN ANTARCTIC SNOW AND FIRM: POTENTIAL SOURCES AND MECHANISMS OF FORMATION. Parker, B.C., et al, Annals of placiology, 1982, Vol.3, International Symposium on Antarctic Glaciology, 3rd, Columbus, Ohio, Sep. 7-12, 1981, p.243-248, 33 refs.

Zeller, E.J., Gow, A.J.

37-280
SNOW COMPOSITION, SNOW IMPURITIES, PERIODIC VARIATIONS, NITRATE DEPOSITS, ANTARCTICA—EAST ANTARCTICA.

ANTARCTICA—EAST ANTARCTICA.

Data are summarized on in situ nitrate ion concentrations in anow pits and firn cores over the last 3,250 a. Nitrate fluctuations show seasonal, 11 and 22 a periodicities, and fluctuations show seasonal, 11 and 22 a periodicities, and fluctuations show seasonal, 11 and 22 a periodicities, and fluctuations show seasonal, 11 and 22 a periodicities, and solar activity peaks. Long-term lows and highs conform to solar activity minima and maxima. The data svailable support the hypothesis that nitrate is fixed in the upper atmosphere by some solar-mediated phenomenon causing a periodicity in East Antarctics snow. Background levels and non-periodic spikes in nitrate come from other sources. (Auth.) (Auth.)

MP 1552

SOME RECENT TRENDS IN THE PHYSICAL AND CHEMICAL CHARACTERIZATION AND MAPPING OF TUNDRA SOILS, ARCTIC SLOPE OF ALASKA.

Everett, K.R., et al, Soil science, May 1982, 133(5), p.264-280, Refs. p.278-280. Brown, J.

37-174

TUNDRA, SOIL SURVEYS, PERMAPROST PHY-SICS, SLOPE ORIENTATION, SOIL CHEMISTRY, SOIL WATER, SOIL STRUCTURE, SOIL CLASSIFICATION, DISTRIBUTION, MAPPING, UNITED STATES—ALASKA—NORTH SLOPE.

DEFORMATION AND FAILURE OF FROZEN SOILS AND ICE AT CONSTANT AND STEADI-LY INCREASING STRESSES.

Fish, A.M., Canadian Permafrost Conference, 4th, Calgary, Alberta, Mar. 2-6, 1981. Proceedings, Ottawa, National Research Council of Canada, 1982, p.419-428, With French summary. 16 refs. 37-385

37-383
PERMAFROST PHYSICS, FROZEN GROUND STRENGTH, FROZEN GROUND COMPRESSION, FROZEN GROUND MECHANICS, SOIL CREEP, ICE DEFORMATION, ICE STRENGTH, STRESSES, ICE CREEP, ANALYSIS (MATHEMATICS), EXPERIMENTATION.

EMATICS), EXPERIMENTATION.

Experimental and theoretical studies were made of the deformation and time-dependent failure of ice. Uniaxial compression tests were performed in the laboratory at constant and steadily increasing stresses. Strength criteries and unified constitutive equations describing all three stages of creep at constant stress are presented. It is shown that regardless of the stress regime (constant stress or step loading) the equations describe deformation and time-dependent failure by five parameters. The form of the constitutive equations, which can be applied also to describe the mechanical properties of frozen and unfrozen soils, make it possible to obtain analytical solutions of the practical problems and to determine

the creep parameters of frozen and unfrozen soils and ice in situ.

MP 1554

THEORY OF THERMAL CONTROL AND PRE-VENTION OF ICE IN RIVERS AND LAKES. Ashton, G.D. Advances in hydroscience, 1982, Vol.13, p.131-185, 38 refs.

37-684
ICE CONTROL, RIVER ICE, LAKE ICE, THERMAL REGIME, HEAT TRANSFER, WATER FLOW, WATER TEMPERATURE, BUBBLING, ICE FORMATION, ICE GROWTH, ICE MELT-

ING, ANALYSIS (MATHEMATICS).

The thermal control of ice in rivers and lakes is accomplished in most cases by modifying the energy budget of the ice cover. In most cases the modification is to increase the flow of heat to the underside of the ice cover, either by directing against it a flow of warm water obtained from other parts of the water body, as in the case of air bubbler systems, or by increasing the temperature of the existing flow of water, as in the case of rivers.

MP 1555

IN-SITU MEASUREMENTS OF THE ME-CHANICAL PROPERTIES OF ICE. Tatinclaux, J.C., International Conference on Marine

Research, Ship Technology and Ocean Engineering, Hamburg, Sep. 29-30, 1982. Proceedings. Inter-maritec '82, Hamburg, 1982, p.326-334, 7 refs.

ICE MECHANICS, ICE COVER STRENGTH, ICE ELASTICITY, FLEXURAL STRENGTH, FLOATING ICE, ANALYSIS (MATHEMATICS).

Two methods for in-situ determination of the bending strength and elastic modulus of ice are presented. The first method and elastic modulus of ice are presented. The first method requires failure tests of a series of cantilever beams of various length over thickness ratios, while the second method is based on failure testing of a free-floating beam of length at least three times the ice characteristic length. Both methods avoid the need for measuring beam deflection in order to determine the elastic modulus. The analytical background of the methods is presented, and their advantages and disadvantages as compared to conventional methods are discussed together with their likely application to field or laboratory use.

STANDARDIZED TESTING METHODS FOR MEASURING MECHANICAL PROPERTIES OF

Schwarz, J., et al, Cold regions science and technology, July 1981, 4(3), p.245-254, 18 refs. Frederking, R., Gavrilo, V.P., Petrov, I.G., Hirayama, K., Mellor, M., Tryde, P., Vaudrey, K.D.

ICE MECHANICS, COMPRESSIVE PROPER-TENSILE PROPERTIES, ICE ELASTICITY, STANDARDS, LOADS (FORCES), TESTS.

STANDARDS, LOADS (FORCES), TESTS.

The results of nominally similar tests vary greatly due to the fact that almost every ice research group uses different testing methods. This is of course a hindrance to the loc Engineering field. In order to improve the quality, comparability and usefulness of the test data resulting from mechanical property investigatious, the LAHR Section on Ice Problems considers it necessary to standardize ice testing methods. Herewith the Working Group of the LAHR Section on Ice Problems proposes its recommendation for "Standardized Testing Methods for Measuring Mechanical Properties of Ice." It should be noted that the suggested recommendations remain open to revision as the development of ice testing methods progresses.

MP 1557

FROST SUSCEPTIBILITY OF SOIL; REVIEW

OF INDEX TESTS.

Chamberlain, B.J., U.S. Federal Highway Administration. Interim report, Aug. 1982, FHWA/RD-82/081, 110p., Refs. p.83-88.

37-973
FROST HEAVE, SOIL MECHANICS, SOIL FREEZING, ICE WATER INTERFACE, ICE SOLID INTERFACE, TESTS, CLASSIFICATIONS, TEMPERATURE GRADIENTS, SOIL WATER, PARTICLE SIZE DISTRIBUTION, GRAIN SIZE.

GRAIN SIZE.

Methods of determining the frost susceptibility of soils are identified and presented in this report. More than one hundred criteria were found, the most common based on particle size characteristics. These particle size criteria are frequently augmented by information such as grain size distribution, uniformity coefficients and Atterberg limits. Information on permeability, mineralogy and soil classification has also been used. More complex methods requiring pore size distribution, moisture-tension, hydraulic-conductivity, heave-streas, and frost-heave tests have also been proposed. However, none has proven to be the universal test for determining the frost susceptibility of soils. Based on this survey, four methods are proposed for further study. They are the U.S. Army Corps of Engineers Frost Susceptibility Classification System, the moisture-tension hydraulic-conductivity test, a new frost-heave test, and the CBR-after-thaw test.

DESIGNING WITH WOOD FOR A LIGHT-WEIGHT AIR-TRANSPORTABLE ARCTIC SHELTER: HOW THE MATERIALS WERE TESTED AND CHOSEN FOR DESIGN.

Planders, S.N., et al, Structural use of wood in adverse environments. Edited by R.W. Meyer and R.M. Kel-logg, New York, Van Nostrand Reinhold Co., 1982, p.385-397. Tobiasson, W.

37-1030 PORTABLE SHELTERS, WOODEN STRUCTURES, MILITARY TRANSPORTATION, COLD WEATHER TESTS, LOADS (FORCES), AIR-PLANES, DESIGN, CONSTRUCTION MATERI-

Construction of a prototype shelter particularly suited to accommodate a party of four to six in the extreme cold at remote locations has been completed recently. To facilitate transportation, the shelter doubles as an ISO shipping tate transportation, the shelter doubles as an ISO shipping container and self-loads onto military aircraft. These modes endure severe loads. Wood was chosen as a suitable material for use in the cold. The requirement for light weight necessitated that the wood be used close to its strength limits. The limits for bonding wood and employing composite panels were tested and compared with calculated values. Urethane-based adhesive was chosen to bound high-density overlay (HDO) plywood and redwood sections together. Fiberglass-reinforced plastic (FRF) mat was chosen as a material to strengthen webs against shear.

MP 1539 SYNOPTIC WEATHER CONDITIONS DURING SELECTED SNOWFALL EVENTS BETWEEN DECEMBER 1981 AND FEBRUARY 1982. Bilello, M.A., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1982,

82-8, p.9-42. 37-1095

SYNOPTIC METEOROLOGY, SNOWPALL, SNOWSTORMS, WEATHER OBSERVATIONS, STATISTICAL ANALYSIS.

MP 1560 METEOROLOGY.

Bates, R.E., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1982, 82-8, p.43-180. 37-1096

METBOROLOGICAL DATA, SNOWSTORMS, SNOWFALL, STATISTICAL ANALYSIS, SNOW DEPTH, SNOW WATER EQUIVALENT, SNOW TEMPERATURE.

MP 1561

SNOW CRYSTAL HABIT.

Koh, G., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1982, 82-8, p.181-216, 5 refs. O'Brien, H.W.

37-1097

SNOWFLAKES, SNOW CRYSTAL STRUCTURE, SNOW OPTICS, SNOWFALL, PARTICLE SIZE DISTRIBUTION, SPECTRA.

AIRBORNE SNOW AND FOG DISTRIBU-TIONS.

Berger, R.H., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1982, 82-8, p.217-223. 37-1098

SNOWFLAKES, SNOWSTORMS, SNOW CRYS-TAL STRUCTURE, FOG, UNFROZEN WATER CONTENT, PARTICLE SIZE DISTRIBUTION, CLASSIFICATIONS.

MEASUREMENTS OF AIRBORNE-SNOW CONCENTRATION.

Lacombe, J., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1982, 82-8, p.225-281, 2 refs. 37-1099

SNOWFALL, SNOWFLAKES, COMPUTER AP-PLICATIONS, MEASUREMENT.

SNOW COVER CHARACTERIZATION. O'Brien, H.W., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1982, 82-8, p.559-577, 7 refs.

Bates, R.E. 37-1106 SNOW COVER, SNOWFALL, SNOW DEPTH, SNOW HARDNESS, SNOW DENSITY, SNOW TEMPERATURE, UNFROZEN WATER CON- MP 1565

PERMEABILITY OF A MELTING SNOW COV-

Colbeck, S.C., et al, Water resources research, Aug. 1982, 18(4), p.904-908, 16 refs.
Anderson, B.A.
37-1226

SNOW MELTING, SNOW PERMEABILITY, MELTWATER, SNOW DENSITY, SNOW COV-ER, SATURATION, RUNOFF.

DRS, SAIUKAHON, KUNOFF.

Data from anow lyaimeters in California and Vermont are used to find the saturated permeability of a melting snow cover in the range of 10-40x10/(10 ag m) depending on snow density. The unsaturated permeability increases as about the third power of liquid saturation. The gravity flow theory is shown to be an accurate representation of netwater drainage from snow covers in two diverse areas even though the snow covers are treated as homogeneous units. The variation of saturated permeability with unow density occurs about as predicted by Shimizu's formula for dry anow, although ice layers decrease the permeability somewhat.

MP 1566 PHYSICAL ASPECTS OF WATER FLOW THROUGH SNOW.

Colbeck, S.C., Advances in hydroscience. Volume 11. Edited by V.T. Chow., New York, Academic Press, 1978, p.165-206, Refa. p.204-206.

WET SNOW, SNOW HYDROLOGY, WATER FLOW, SNOW PERMEABILITY, SNOW COVER STRUCTURE, POROUS MATERIALS, THERMODYNAMICS, RAIN, MATHEMATICAL MOD-

MP 1567

SENSITIVITY OF A FROST HEAVE MODEL TO THE METHOD OF NUMERICAL SIMULA-

Hromadka, T.V., II, et al, Cold regions science and technology, Aug. 1982, 6(1), p.1-10, 10 refs. Guymon, G.L., Berg, R.L.

37-1329 77-1329 FROST HEAVE, SOIL FREEZING, TRANSFER, MATHEMATICAL M MODELS, ANALYSIS (MATHEMATICS).

ANALYSIS (MATHEMATICS).

A unifying numerical method is developed for solution of frost heave in a vertical freezing column of soil. Within one general computer code a single unifying parameter can be preselected to employ the commonly used Galerkin finite elements, subdomain weighted residual, or finite difference methods as well as several other methods developed from the Alternation Theorem. Comparing results from the various numerical techniques in the computation of frost heave to measured frost heave in absoratory column indicates there is little advantage of the numerical technique over another.

MP 1568
DETERMINATION OF THE FLEXURAL
STRENGTH AND ELASTIC MODULUS OF ICE
FROM IN SITU CANTILEVER-BEAM TESTS.
Tatinclaux, J.C., et al, Cold regions science and technology, Aug. 1982, 6(1), p.37-47, 4 refs.
Hirayama, K.
37-1333
COURT STRENGTH HERVINAL

ICE COVER STRENGTH, FLEXURAL STRENGTH, ICE ELASTICITY, ICE PHYSICS, LOADS (FORCES), ICE SHEETS, ANALYSIS (MATHEMATICS).

(MATRISMATICS). From the theory of cantilever beams on an elastic foundation, it is shown that the atrength index and modulus index of ice can be determined from measurements of either the failure load or the tip deflection, or both, of in situ cantilever beams tested over a wide enough range of ratio of beam length to beam thickness. Four methods are proposed, two of which do not require the measurement of beam deflection during beam loading, an often difficult task to perform with sufficient reliability, especially in the field.

ICE DISTRIBUTION AND WINTER SURFACE CIRCULATION PATTERNS, EACHEMAN BAY.

ALASKA. Gatto, L.W., Remote sensing of environment, 1982, No.12, p.421-435, For more detailed article see 36-2432. 14 refs.

37-1440 SEA ICE DISTRIBUTION, ICE CONDITIONS, OCEAN CURRENTS, SUSPENDED SEDI-MENTS, OCEANOGRAPHY, REMOTE SENS-ING, UNITED STATES—ALASKA—KA-CHEMAK BAY.

DETERMINING THE CHARACTERISTIC LENGTH OF MODEL ICE SHEETS.

Sodhi, D.S., et al. Cold regions science and technology, Nov. 1982, 6(2), p.99-104, 6 refs. Kato, K., Haynes, F.D., Hirayama, K.

37-1582

FLOATING ICE, ICE STRENGTH, ICE SHEETS, LOADS (PORCES), FLEXURAL STRENGTH, ICE ELASTICITY, STRESSES, ICE CREEP, ICE MOD-

ELS.

For determining the characteristic length of a floating ice sheet, a vertical load is applied to the ice sheet either by placing dead weights in discrete increments or with a screw drive apparatus in series with a load cell, and the deflection of the ice sheet is monitored at the point of loading or near it. For a model ice sheet exhibiting creep behavior, the experimental results with the screw apparatus show that the slope of the load-deflection curve decreases as the load increases, and one is not able to choose a unique value of the slope for the computation of stress in ice.

This is attributed to relaxation of stress in ice.

MP 1571

FIRN QUAKE (A RARE AND POORLY EX-PLAINED PHENOMENON).

DenHartog, S.L., Cold regions science and technology, Nov. 1982, 6(2), p.173-174, 7 refs. 37-1589

FIRN, SNOW DEFORMATION, SNOW SUR-FACE, CRACKS.

A firn quake is a sudden collapse of a snow surface with a noise of increasing intensity. This description applies to firn quakes on large ice sheets, shuch as cover Greenland and Antarctica. There are many unknowns about firn quake phenomena. MP 1572

ELECTRICAL PROPERTIES OF FROZEN GROUND AT VHF NEAR POINT BARROW.

Arcone, S.A., et al, IEEE transactions on geoscience and remote sensing, Oct. 1982, GE-20(4), p.485-492,

Delaney, A.J. 37-1685

FROZEN GROUND PHYSICS, ELECTRICAL PROPERTIES, RADIO WAVES, GROUND ICE, MODELS, ORGANIC SOILS, SOIL WATER.

Riccircial properties of frozen ground were measured using radio frequency interferometry (RFI) in the very high frequency (VHF) radiowave band. Ice-rich organic silts and aandy gravel of variable ice content were investigated during early April of both 1979 and 1980. Prequencies between 10 and 130 MHz were used but best results were obtained at VHF between 10 and 100 MHz.

MP 1573

STATE OF THE ART OF SHIP MODEL TEST-ING IN ICE.
Vance, G.P., American Towing Tank Conference, General Meeting, 19th, Ann Arbor, Michigan, July 9-11, 1980. Proceedings, Vol.2. Edited by S.B. Cohen, Ann Arbor, Science Publishers, [1981], p.693-706, 5 refs. 37-1692

ICE LOADS, ICE PRESSURE, SHIPS, STRENGTH, MODELS, LOADS (FORCES), TESTS, SNOW COVER EFFECT.

MP 1574 UNIFORM SNOW LOADS ON STRUCTURES. O'ROURE, M.J., et al, American Society of Civil Engineers. Structural Division. Journal, Dec. 1982, 108(ST12), p.2781-2798, 12 refs.
Redfield, R., Von Bradsky, P.
37-1756

SNOW LOADS, ROOFS, STRUCTURES, SLOPE ORIENTATION, EXPOSURE, SNOW ACCUMULATION, THERMAL EFFECTS, SURFACE **PROPERTIES**

Data on ground and roof snow loads for 199 structures are analyzed. Relationship between ground-to-roof conversion factor for uniform roof loads and parameters such as roof slope, exposure and thermal characteristics are investigated. The conversion factor was found to be most strongly influenced by exposure.

MP 1575 APPLICATION OF HEC-2 FOR ICE-COVERED

WATERWAYS.
Calkins, D.J., et al, American Society of Civil Engineers. Technical Councils of ASCE. Journal, Nov. 1982, 108(TC2), p.241-248, 5 refs.
Hayes, R., Daly, S.F., Montalvo, A.

CHANNELS (WATERWAYS), WATER FLOW, ICE COVER EFFECT, PLOATING ICE, FLOW, RATE, RIVER FLOW, COMPUTER PROGRAMS. HEC-2, the widely known open channel flow water surface profile computer program developed by the U.S. Army Corpa

of Engineers' Hydrologic Engineering Center, has been recently updated for the U.S. Army Cold Regions Research and Engineering Laboratory to account for the presence of a floating ice cover. It has been shown by many writers Engineering Laboratory to account for the presence of a floating ice cover. It has been shown by many writers that at uniform flow the normal flow depth can be increased by as much as 30% by a floating ice cover. HEC-2 with the ice cover option will allow the Corps of Engineers and other users of the program to evaluate effectively the effect of an ice cover on the flow depth, flow velocity, unit discharge, etc., in a river system. This paper presents an overview of the modifications to the uniform flow equation, the required input data, and an analysis.

MP 1576 SOURCE MECHANISM OF VOLCANIC TREM-OR.

Oss. Perrick, M.G., et al, *Journal of geophysical research*, Oct. 10, 1982, 87(B10), p.8675-8683, 27 refs. Qamar, A., St. Lawrence, W.F. 37-2111

Qamar, A., St. Lawrence, W.F.
37-2111

BARTHQUAKES, VOLCANOES, FLUID DYNAMICS, FLUID FLOW, UNITED STATES—
OREGON—HOOD, MOUNT.

Low-frequency (<10 Hz) volcanic earthquakes originate at a wide range of depths and occur before, during, and after magmatic eruptions.

The characteristics of these earthquakes suggest that they are not typical tectonic events, country analogous processes occur in hydraulic fracturing of rock formations, low-frequency icequakes in temperate glaciers, and autoresonance in hydroelectric power stations. We propose that unsteady fluid flow in volcanic conduits is the common source mechanism of low-frequency volcanic arthquakes (tremor). The fluid dynamic source mechanism explains low-frequency earthquakes of arbitrary duration, magnitude, and depth of origin, as unsteady flow is independent of physical properties of the fluid and conduit. Fluid transients occur in both low-viscosity gases and high-viscosity dudids. A fluid transient analysis can be formulated as generally as is warranted by knowledge of the composition and physical properties of the fluid, material properties, geometry and roughness of the conduit, and boundary conditions. (Auth. mod.)

MP 1577

COMMENT ON WATER DRAG COEFFICIENT OF FIRST-YEAR SEA ICE' BY M.P. LANGLEB-EN.

Andreas, E.L., et al, Journal of geophysical research, Jan. 20, 1983, 88(C1), p.779-782, includes the comment by Andreas and the reply by Langleben. For the article being discussed see 36-2494. 11 refs. Langleben, M.P.

SEA ICE, SURFACE ROUGHNESS, FRICTION, ANALYSIS (MATHEMATICS).

MP 1578 MICROBIOLOGICAL AEROSOLS FROM FIELD-SOURCE WASTEWATER IRRIGATION SYSTEM.

Bausum, H.T., et al, Water Pollution Control Federa-tion. Journal, Jan. 1983, 55(1), p.65-75, 20 refs. Schaub, S.A., Bates, R.E., McKim, H.L., Schumacher, P.W., Brockett, B.E. 37-2176

WASTE TREATMENT, WATER TREATMENT, BACTERIA, AEROSOLS, IRRIGATION, MICROBIOLOGY.

MF 15.79
ON MODELING SEASONAL AND INTERANNUAL FLUCTUATIONS OF ARCTIC SEA ICE.
Hibler, W.D., III, et al, Journal of physical oceanography, Dec. 1982, 12(12), p.1514-1523, 20 refs.
Walsh, J.E.

37-2362 SEA ICE DISTRIBUTION, PERIODIC VARIA-TIONS, ICE MODELS.

TIONS, ICE MODELS.

Some results from a series of three-year aperiodic simulations of the Northern Hemisphere sea ice cover are reported. The simulations employ the dynamic-thermodynamic sea see model developed by Hiber (1979) and use a one-day timestep on a 35 x 31 grid with a resolution of 222 km. Atmospheric data from the years 1973-75 are used to drive the simulationa. The simulations yield a seasonal cycle with excessive amounts of open water in the central Arctic during summer. Despite the seasonal bias, the simulated and observed interannual fluctuations are similar in magnitude and are positively correlated. The correlations with observed data are noticeably smaller when dynamical processes are omitted from the model. The simulated outflow of ice through the Greenland-Spitobergen passage undergoes large fluctuations both seasonally and on an interannual basis. The outflow correlates highly with the simulated fluctuations of ice coverage in the North Atlantic sector and positively with the observed fluctuations of ice coverage in the same sector.

MP 1580 ADHESION OF ICE TO POLYMERS AND OTHER SURFACES.

Itagaki, K., Physicochemical aspects of polymer surfaces, Vol.1. Edited by K.L. Mittal, Plenum Publishing Corporation, Mar. 1983, p.241-252, 15 refs. 37-2274

ICE ADHESION, ICE SOLID INTERFACE, ICE STRENGTH, POLYMERS, PROTECTIVE COAT-INGS

A set of simple experiments indicated that water drops can penetrate through a greese layer and make "real" contact with the substrate, then spread over the surface, depending on the surface energy of the substrate, increasing the "real" contact area. Furthermore the ice/substrate bond is stronger than ice itself. The complex problem of ice adhesion contact area. "urunemore the toe'substrate bond is stronger than ice itself. The complex problem of ice adhesion may be explainable by combination of these findings in that the "real" contact area multiplied by the strength of ice within the area constitute the apparent adhesive strength. Conceivable effects of various factors are discussed. MP 1581

MP 1581
PROCEEDINGS.
International Offshore Mechanics and Arctic Engineering Symposium, 2nd, Houston, Texas, Jan. 30-Feb. 3, 1983, New York, N.Y., American Society of Mechanical Engineers, 1983, 813p., Refs. passim. For selected papers see 37-2389 through 37-2406.
Chung, J.S., ed, Lumardini, V.J., ed. 37-2388

37-2355
OFFSHORE DRILLING, OFFSHORE STRUCTURES, ICE CONDITIONS, DRIFT, PERMA-FROST, ARTIFICIAL ISLANDS, ICE LOADS, COMPUTER APPLICATIONS, ICE PHYSICS, SEA ICE.

MP 1582

EFFECT OF STRESS APPLICATION RATE ON THE CREEP BEHAVIOR OF POLYCRYSTAL-LINE ICE.

Cole, D.M., International Offshore Mechanics and Arctic Engineering Symposium, 2nd, Houston, Texas, Jan. 30-Feb. 3, 1983. Proceedings. Edited by J.S. Chung and V.J. Lunardini, New York, N.Y., American Society of Mechanical Engineers, 1983, p.614-621, 14

ICE CREBP, ICE CRYSTAL STRUCTURE, ICE ACOUSTICS, STRESS STRAIN DIAGRAMS, MICROSTRUCTURE, ICE CRACKS, RHEOLOGY, CRACKING (FRACTURING), TIME FACTOR.

CRACKING (FRACTURING), TIME FACTOR. This work ezamines the effect of the rate of stress application on the creep behavior of polycrystalline ice. Stress rates from 1/1000 to 1.84 MPa/s were used to achieve a creep stress of 3.6 MPa as test temperatures of -5 to -10C. The treatment emphasizes the effect of stress application rate on primary creep behavior said the accompanying microfracturing activity. Acoustic emission measurements taken in all tests indicate the onset and rate peak of the microfracturing activity. activity.

MP 1583

FREEZING OF SEMI-INFINITE MEDIUM WITH INITIAL TEMPERATURE GRADIENT. unardini, V.J., International Offshore Mechanics and Arctic Engineering Symposium, 2nd, Houston, Texas, Jan. 30-Feb. 3, 1983. Proceedings. Edited by J.S. Chung and V.J. Lunardini, New York, N.Y., American Society of Mechanical Engineers, 1983, p.649-652, 11 37-2307

SOIL FREEZING, HEAT TRANSFER, TEMPER-ATURE GRADIENTS, STEFAN PROBLEM, GEOTHERMY, HEAT BALANCE, ANALYSIS (MATHEMATICS), THERMAL CONDUCTIVITY. (MATHEMATICS), THERMAL CONDUCTIVITY. Exact solutions to problems of conductive heat transfer with solidification are rare due to the non-linearity of the equations. The heat balance integral technique is used to obtain an approximate solution to the freezing of a semi-infinite region with a linear, initial temperature distribution. The results indicate that the constant temperature Neumann solution is acceptable for soil systems with a geothermal gradient unless extremely long freezing times are considered. The heat balance integral will yield good solutions, with simple numerical work, even for non-constant initial temperatures.

AMP 1628. MP 1584

SIMPLE FIXED MESH FINITE ELEMENT SO-LUTION OF TWO-DIMENSIONAL PHASE CHANGE PROBLEMS.

O'Neill, K., International Offshore Mechanics and Arctic Engineering Symposium, 2nd, Houston, Texas, Jan. 30-Feb. 3, 1983. Proceedings. Edited by J.S. Chung and V.J. Lunardini, New York, N.Y., American Society of Mechanical Engineers, 1983, p.653-658, 24

37-2398 FREEZE THAW CYCLES, HEAT TRANSFER, PHASE TRANSFORMATIONS, LATENT HEAT, THERMAL CONDUCTIVITY, MATHEMATICAL MODBLS, ENTHALPY

An algorithm has been developed for two-dimensional freezing and thaving problems, which may also be useful for some other phase change problems. It is designed to be implemented simply in standard finite element best conduction computer codes which use linear interpolation within elements. Substances with discrete phase change temperatures such as water suffer a step change in enthalpy across a phase change isotherm, and hence feature a theoretically infinite heat capacity there. The algorithm handles this potentially troublesome phenomenon in a natural way through usual finite element procedures, using simple closed form expressions. MP 1585

ICE DYNAMICS IN THE CANADIAN AR-CHIPELAGO AND ADJACENT ARCTIC BASIN AS DETERMINED BY ERTS-1 OBSERVA-TIONS.

r, R.O., et al, Canada's continental margins and offshore petroleum exploration. Edited by C.J. Yorath, E.R. Parker and D.J. Glass, Calgary, Alberta, Canadian Society of Petroleum Geologists, May 1975, p.853-877, 13 refs. Campbell, W.J., Weeks, W.F., Drapier-Arsenault, L.,

Wilson, K.L.

37-2463 ICE MECHANICS, SEA ICE DISTRIBUTION, DRIFT, ICE CONDITIONS, REMOTE SENSING, ICE BREAKUP, FREEZEUP, ERTS IMAGERY.

ICE BREAKUP, FREEZEUP, ERTS IMAGERY.

ERTS-1 "Quicklock" imagery for the period March to November 1973 has been utilized to study sea ice in the Canadian archipelago and in the adjacent Arctic basin. The imagery, which provides extensive coverage of the area of interest, contains detailed information on variations in sea ice dynamics and ice morphology on a time scale ranging from several days to seasons. Because of the sidelap of the ERTS-1 orbits over the study area, recognizable ice flose could be tracked on repetitive delly images for time periods as long as 6 days.

Information on ice drift velocity, compactness, floe size, fast ice and ice melt patterns, and dates of breakup and freezeup were obtained.

MP 1586 SIMULATION OF THE ENRICHMENT OF AT-MOSPHERIC POLLUTANTS IN SNOW COVER RUNOFF.

Colbeck, S.C., *Eastern Snow Conference*. Proceedings, 1981, 38th, p.1-10, 16 refs. For another version see 36-1887. 37-2768

37-2768
SNOW COMPOSITION, SNOW IMPURITIES, AIR POLLUTION, RUNOFF, MELTWATER, ENVIRONMENTAL IMPACT, SNOW CRYSTAL NUCLEI, EXPERIMENTATION, SNOW COVER. The soluble impurities contained in a snow cover can be concentrated as much as five fold in the first fractions of snow melt runoff. In addition, daily impurity surges are possible. Melt-freeze cycles concentrate the impurities in the lower portion of the snow cover hence prepare the impurities for rapid removal. Environmental damage can occur due to the concentration and rapid release of atmospheric pollutants from the snow, especially in areas of "acid prec-tion." The enrichment of the soluble impurities is expla-and the results of laboratory experiments are given MP 1597

MP 1587 STRESS/STRAIN/TIME RELATIONS FOR ICE UNDER UNIAXIAL COMPRESSION. Mellor, M., et al, Cold regions science and technology, Feb. 1983, 6(3), p.207-230, 9 refs.

Cole. D.M.

37-2878

ICE CREEP, ICE MECHANICS, STRESS STRAIN DIAGRAMS, LOADS (FORCES), COMPRESSIVE PROPERTIES, STATIC LOADS, TIME FACTOR, ANALYSIS (MATHEMATICS), TESTS, RHEOLO-

Results of mechanical tests involving uniaxial compression of isotropic ice at -5C were analysed and interpreted. Constant load (CL) creep tests were made for applied stresses in the range 0.8 to 3.8 MPa, and "strength" tests under constant displacement rate (CD) were made for applied strain rates in the range 1/10,000,000 to 1/1,000 1/a. Results from CL tests and CD tests corresponded closely, giving much the same information about failure strains, strength, creep rates, time to failure, stress/strain-rate relations, etc. MAP 1882 MP 1588

PHYSICS OF MATHEMATICAL FROST HEAVE

MODELS: A REVIEW.
O'Neill, K., Cold regions science and technology, Feb. 1983, 6(3), p.275-291, Refs. p.289-291. 37-2883

FROST HEAVE, FROZEN GROUND PHYSICS, THERMODYNAMICS, PHYSICAL PROPERTIES, STRESSES, MATHEMATICAL MODELS, GROUND ICE.

TROUND ICE.

This paper is concerned with the physical and thermodynamical bases of frost heave modeling. An attempt is made to isolate and illuminate issues which all such models must address, at least by implication. Although numerous relevant publications are surveyed, emphasis is less on an enumeration of items in the literature, and more on the concepts themselves, and on their alternative mathematical expressions, approximations, and manners of applications.

Ultimately a selection

of specific mathematical models is discussed, in light of the points raised in the general discussion.

MP 1509
PRELIMINARY INVESTIGATION OF THE ACOUSTIC EMISSION AND DEFORMATION RESPONSE OF FINITE ICE PLATES. Xirouchakia, P.C., et al, National Research Council,

Canada. Associate Committee on Geotechnical Re-assrch. Technical memorandum, Jan. 1982, No.134. p.129-139, 10 refs. St. Lawrence, W.F.

37-2905 ICE ACOUSTICS, ICE DEFORMATION, LOADS (FORCES), FRACTURING, PLATES, ICE CRACKS, BLASTIC WAVES, VISCOELASTICITY, GRAIN SIZE, EXPERIMENTATION.

GRAIN SIZE, EXPERIMENTIATION.

A procedure is described for monitoring the microfracturing activity in ice plates subjected to constant loads. Sample time records of fresh water ice plate deflections as well as corresponding total acoustic emission activities are presented. The linear elastic as well as visco-elastic response for a simple supported rectangular ice plate is obtained. Suggested future work using the above procedure is discussed.

MAP 1970
MODELING PRESSURE RIDGE BUILDUP ON THE GEOPHYSICAL SCALE.
Hibler, W.D., III, National Research Council, Canada. Associate Committee on Geotechnical Research. Technical memorandum, Jan. 1982, No.134, p.141-155 37-2906

PRESSURE RIDGES, ICE COVER THICKNESS, ICE PILEUP, ICE STRENGTH, ICE PHYSICS, SEA ICE DISTRIBUTION, SURFACE ROUGH-NESS, STRESSES, ICE MODELS, PACK ICE.

NESS, STRESSES, ICE MODELS, PACK ICE. In large scale sea ice models ridging is modeled by redistributing thin ice into thicker categories. The way in which this redistribution is carried out can significantly affect the geophysical stresses in pack ice. This paper compares ice strength characteristics of several different redistributors and discusses the relationship of these redistributors with observed ridge morphological data. In addition, simulated Arctic Basin ridge buildup results using one of these redistributors are presented and compared to roughness observations reported in the literature.

MP 1591

FIELD METHODS AND PRELIMINARY RE-SULTS FROM SUBSEA PERMAFROST INVES-TIGATIONS IN THE BEAUFORT SEA, ALASKA ellmann, P.V., et al., National Research Council, anada. Associate Committee on Geotechnical Re-earch. Technical memorandum, June 1979, No.124, Canada. p.207-213, 6 refs.

Chamberlain, E.J., Blouin, S.E., Iskandar, I.K., Lewel-

len, R.I. 37-2962

SUBSEA PERMAPROST, PERMAPROST THER-MAL PROPERTIES, PENETRATION TESTS, GEOPHYSICAL SURVEYS, TEMPERATURE GRADIENTS, GROUND WATER, WATER CHEMISTRY, ENGINEERING, BEAUFORT

NUMERICAL SIMULATION OF THE WED-DELL SEA PACK ICE.

Hibler, W.D., III, et al, Journal of geophysical research, Mar. 30, 1983, 88(C5), p.2873-2887, 29 refa. Ackley, S.F. 37-2983

SEA ICE, ICE MECHANICS, DRIFT, ICE MOD-ELS, ICE COVER THICKNESS, ANTARCTICA— WEDDELL SEA.

WEDDELL SEA.

The simulations employ a dynamic thermodynamic model developed in 1979 and use a 1-day time step on an 18 z 15 grid with a resolution of 122 km. Daily atmospheric data from 1979 are used to drive the simulations, which yield a seasonal cycle of ice with maximum extents close to that observed. The advance of the ice is primarily thermodynamic in nature, while the rapid decay depends critically on the presence of both leads and lateral ice advection. The average fraction of open water is substantial and varies from 10% in September to 35% in March. These values are in general agreement with estimates from satellite microwave data. Mean ice thicknesses are consistent with observations and vary from about 3 m in the perennal ice in the western Weddell. Simulated ice drift results yield mean drift rates of about 5 km/day, in good agreement with body drift observations with alightly inadequate northward transport in the western Weddell. Near the ice edge the drift rates are relatively insensitive to the ice strength. Near the coast, however, lower strengths are found to yield a decrease in northward drift rates. (Auth. mod.)

MP 1593

Lunardini, V.J., Journal of heat transfer, Feb. 1983, 105(1), p.25-32, 14 refs. 37-3169 APPROXIMATE PHASE CHANGE SOLUTIONS

57-3109
FREEZE THAW CYCLES, UNDERGROUND
PIPELINES, HEAT TRANSFER, PIPES (TUBES),
PHASE TRANSFORMATIONS, THERMAL
PROPERTIES, THERMAL INSULATION, TEMPERATURE EFFECTS, ANALYSIS (MATH-

EMATICS).

The conduction problem for cylinders embedded in a medium with variable thermal properties cannot be solved exactly if phase change occurs. New, approximate solutions have been found using the quasi-steady method. These solutions consider heat flow from the entire pipe surface, rather than from a single point, as has been assumed in the past. The temperature field, phase change location, and pipe surface heat transfer can be evaluated using graphs presented for parametric range of temperature, thermal properties, burial depth, and insulation thickness.

MP 1594 COMPARISON OF UNFROZEN WATER CON-TENTS MEASURED BY DSC AND NMR.

Oliphant, J.L., et al, International Symposium on Ground Freezing, 3rd, Hanover, N.H., June 22-24, 1982. Proceedings, (1982), p.115-121, 15 refs. Tice, A.R. 37-3069

UNFROZEN WATER CONTENT, FROZEN GROUND STRENGTH, SPECIFIC HEAT, SOIL FREEZING, TEMPERATURE EFFECTS, CALO-RIMETRY.

Unfrozen water contents of various sands, silts and clay under partially frozen conditions have been measured using Nuclear Magnetic Resonance (NMR). Apparent specific heats for many of these soils have been measured as a function of temperature using Differential Scanning Calorimetry (DSC). Unfrozen water contents have been calculated from the DSC data and compared with those directly measured with those directly measured. with NMR.

MP 1595

FREEZING OF SOIL WITH SURFACE CON-VECTION.

VECTION.

Lunardini, V.J., International Symposium on Ground Freezing, 3rd, Hanover, N.H., June 22-24, 1982. Proceedings, (1982), p.205-212, 17 refs.

37-3079
PERMAFROST PHYSICS, PHASE TRANSFORMATIONS, FROZEN GROUND STRENGTH,
SOIL FREEZING, SURFACE PROPERTIES,
HEAT TRANSFER, ARTIFICIAL FREEZING,
FROZEN GROUND TEMPERATURE, LATENT
HEAT, SURFACE TEMPERATURE, TIME FACTOR, CONVECTION, ANALYSIS (MATHEMATICS) STOPAGE ICS), STORAGE.

Phase change phenomena arise frequently in applications such as thermal design in permafrost regions, thermal storage of latent heat for solar systems, and the heat treatment of metals. These are problems of conductive heat transfer with solidification phase change. Exact solutions are sought for geometries and boundary conditions which are simple and yet representative of practical systems.

MP 1596 INITIAL STAGE OF THE FORMATION OF SOIL-LADEN ICE LENSES.

Takagi, S., International Symposium on Ground Freezing, 3rd, Hanover, N.H., June 22-24, 1982. Proceedings, 1982, p.223-232, 8 refs. 37-3081

GROUND ICE, FROZEN GROUND STRENGTH, GROUND ICE, FROZEN GROUND STRENGTH, ICE LENSES, SOIL FREEZING, ICE FORMATION, ARTIFICIAL FREEZING, FROST HEAVE, THERMAL CONDUCTIVITY, STEFAN PROBLEM, ANALYSIS (MATHEMATICS), FROST ACTION, SOIL WATER.

O'Neill and Miller's equations for frost heave in saturated soil/water system, presented in the 2nd 1.S.O.F.at Trondheim, reduce to heat conduction equations on introduction of two simplifying assumptions. The reduced equations are solved simplifying assumptions. by use of the recently by use of the recently developed analytical method can solve the Stefan problem with arbitrary initial and box

MP 1597

FREEZING AND THAWING: HEAT BALANCE INTEGRAL APPROXIMATIONS.
Lunardini, V.J., Journal of energy resources technolo-

gy, Mar. 1983, 105(1), p.30-37

FREEZE THAW CYCLES, PERMAPROST THER-MAL PROPERTIES, HEAT BALANCE, STEFAN PROBLEM, SOIL FREEZING, GROUND THAW-ING, LATENT HEAT, SURFACE PROPERTIES, HEAT TRANSFER, PHASE TRANSFORMA-TIONS, CONVECTION, ANALYSIS (MATH-EMATICS)

The study of conductive heat transfer with phase change—often called the Stefan problem—includes some of the most intractable mathematical areas of heat transfer. Exact solutions are extremely limited and approximate methods are widely used. This paper discusses the heat balance integral approximation using the collocation method. The method is applied to some standard problems of phase change—Neumann's problem—and a new solution is presented for the case of a semi-infinite body with surface convection. Numerical results are given for soil systems and also for materials of interest in latent heat thermal storage.

APPROXIMATE SOLUTION TO CONDUCTION FREEZING WITH DENSITY VARIATION. Lunardini, V.J., Journal of energy resources technology, Mar. 1983, 105(1), p.43-45, 5 refs. 37-3207

37-3207
HEAT TRANSFER, FREEZE THAW CYCLES,
PERMAPROST THERMAL PROPERTIES, DENSITY (MASS/VOLUME), WATER, PHASE
TRANSFORMATIONS, LATENT HEAT, ANAL-YSIS (MATHEMATICS).

MP 1599 DYNAMICS OF NEAR-SHORE ICE.

DYNAMICS OF NEAR-SHORE ICE.
Kovacs, A., et al. Environmental assessment of the
Alaskan continental shelf, Vol.7, Hazarda. Principal
investigators' annual reports for the year ending
March 1981. Boulder, Colorado, Outer Continental
Shelf Environmental Assessment Program, [1981],

p.125-135. Weeks, W.F.

37-3247

SEA ICE DISTRIBUTION, ICE MECHANICS, DRIFT, PRESSURE RIDGES, ICE PILEUP, ICE SCORING.

SCORING.

Research Unit No.88 investigates sea ice and ice induced gouges in the sea floor along the coasts of the Beaufort, Chukchi, and Bering Seas. New results reported during FY81 include further documentation of coastal ice pileup and over-ride events, studies of the block size distributions in first-year pressure ridges, investigations of additional laser profilometer observations on pressure ridges, rader studies of near-shore lakes on the North Slope that may serve as year-round sources of fresh water, and the preparation of a review paper on the physical environment of arctic Alaska as it relates to petroleum exploration and production.

MP 1600 DELINEATION AND ENGINEERING CHARAC-TERISTICS OF PERMAPROST BENEATH THE BEAUFORT SEA.

BEAUTORT SEA.
Sellmann, P.V., et al, Environmental assessment of the Alaskan continental shelf, Vol.7, Hazards. Principal investigators' annual reports for the year ending March 1981, Boulder, Colorado, Outer Continental Shelf Environmental Assessment Program, [1981].

p.137-156, 4 refs. Neave, K.G., Chamberlain, B.J., Delaney, A.J. 37-3248

SUBSEA PERMAFROST, PERMAFROST DISTRI-BUTION, SEISMIC VELOCITY, ENGINEERING, SEISMIC SURVEYS, NATURAL GAS, BEAU-FORT SEA.

Velocity data derived from the study of industry seismic records from lease area No.71 indicate that bonded permafrost is common. Its distribution will likely be as variable as it is to the east near Prudhoe Bay. Bonded permafrost should extend many kilometers offshore of the islands in the eastern part of the lease area.

MP 1601 TRANSPORT OF WATER IN FROZEN SOIL. EFFECTS OF ICE ON THE TRANSPORT OF WATER UNDER ISOTHERMAL CONDITIONS. WATER UNDER ISOTHERMAL CONDITIONS. Nakano, Y., et al, Advances in water resources, Mar. 1983, 6(1), p.15-26, 16 refs. Tice, A.R., Oliphant, J.L., Jenkins, T.F. 37-3558

SOIL WATER MIGRATION, FROZEN GROUND PHYSICS, GROUND ICE, SOIL FREEZING, WATER TRANSPORT, TEMPERATURE EF-FECTS, ANALYSIS (MATHEMATICS).

Effects of ice on the transport of water in frozen soil were investigated under isothermal conditions. Based on the experimental results obtained using a marine-deposited clay at -1.0C, the presence of ice is shown to significantly affect the transport of water under centain circumstances. A theoretical analysis of the experimental results and a discussion of a possible mechanism for water transport in frozen soil

ICE ENGINEERING.

O'Steen, D.A., Water spectrum, Spring 1980, 12(2), p.41-47. 37-3551

DOCKS, ICE LOADS, PILE STRUCTURES, PILE EXTRACTION, ENGINEERING, OFFSHORE STRUCTURES, WATER LEVEL, PIERS, TESTS.

MP 1603 THEORY OF METAMORPHISM OF DRY

SNOW. Colbeck, S.C., Journal of geophysical research, June 20, 1983, 88(C9), p.5475-5482, 16 refs. 37-3571

METAMORPHISM (SNOW), SNOW CRYSTAL GROWTH, TEMPERATURE GRADIENTS, VAPOR DIFFUSION, ICE CRYSTAL GROWTH, TEMPERATURE EFFECTS, ANALYSIS (MATH-

TEMPERATURE EFFECTS, ANALYSIS (MATH-EMATICS), THEORIES.

The growth of ice particles in dry seasonal snow is caused by vapor diffusion among particles due to temperature gradients imposed on the snow cover. The diffusion is calculated by using the potential field solutions for electrostatically charged particles. The stereography of snow is represented by using a log-normal distribution function for a geometric enhancement factor defined here. Reasonable crystal growth rates and supersaturations are found.

MP 1604 RECENT ADVANCES IN UNDERSTANDING THE STRUCTURE, PROPERTIES, AND BEHAV-IOR OF SEA ICE IN THE COASTAL ZONES OF THE POLAR OCEANS.

Weeks, W.F., et al, International Conference on Port weeks, w.r., et al, international conference on Port and Ocean Engineering under Arctic conditions, 7th, Helsinki, Finland, April 5-9, 1983. Proceedings, Es-poo, Finland, Valtion teknillinen tutkimuskeskus, 1983, p.25-41, 32 refs.

Ackley, S.F. 37-3714

SEA ICE, ICE STRENGTH, PRESSURE RIDGES, ICE CRYSTAL STRUCTURE, ICE WATER INTERFACE, FRAZIL ICE, ICE COVER THICKNESS, ICE FLOES, COMPRESSIVE PROPERTIES, STRAINS, GAS INCLUSIONS, BRINES, WEDDREIJ SEA. TIES, STRAINS, WEDDELL SEA.

WEDDELL SEA.

A review is given of recent field and isboratory studies that have 1) revealed vast areas of first-year sea ice that show strong directional c-axis alignments in the horizontal plane with the alignment directed parallel to the current direction at the ice-water interface at the time the ice formed.

2) Discovered inexpected large amounts of frazil occurring in the thickest flocs.

3) Determined the strength of multiplear pressure ridges to be comparable to that of first-year sea ice in the hard-fail direction.

4) Developed a rapid method of determining the relative volume of gas in sea ice.

MP 1605
PROTECTION OF OFFSHORE ARCTIC STRUCTURES BY EXPLOSIVES.
Mellor, M., International Conference on Port and Ocean Engineering under Arctic conditions, 7th, Helsinki, Finland, April 5-9, 1983. Proceedings, Espoo, Finland, Valtion teknillinen tutkimuskeskus, 1983, p.310-322, 12 refs.
37-3740
ICE BLASTING OFFSTON

37-3740
ICE BLASTING, OFFSHORE STRUCTURES, ICE LOADS, ICE BREAKING, PROTECTION, ICE COVER THICKNESS, IMPACT STRENGTH, ICE MECHANICS, FLOATING STRUCTURES, ENVI-RONMENTAL PROTECTION, DESIGN.

RONMENTAL PROTECTION, DESIGN.

New design curves for ice blasting relate crater radius with charge weight, charge depth, and ice thickness. Single-charge data can be used to design charge patterns for breaking ice in long channels or over broad areas. When charges are optimized to give maximum energetic efficiency, the specific energy is comparable to that for an ice-breaking ahip, and significantly lower than the best attainable specific energy for ice-cutting machines.

Shock attenuation curves for underwater explosions permit the calculation of safe distances for structures, fish and divers.

ICE FORCES ON MODEL MARINE STRUC-

Haynes, F.D., et al, International Conference on Port and Ocean Engineering under Arctic conditions, 7th, Helsinki, Finland, April 5-9, 1983. Proceedings, Espoo, Finland, Valtion teknillinen tutkimuskeakus, 1983, p.778-787, 7 refs. Sodhi, D.S. 37-3776

ICE PRESSURE, OFFSHORE STRUCTURES, ICE SOLID INTERFACE, FLEXURAL STRENGTH, ICE COVER THICKNESS, ICE COVER STRENGTH, ICE ELASTICITY, VELOCITY, EXPERIMENTATION.

PERIMENTATION.

Small-scale laboratory experiments were conducted on model marine structures in the CRREL test basin. The experiments were performed by pushing model ice sheets against structures and monitoring the ice forces during the ice-structure intersection. The parameters, varied during the test program, were the geometry of the marine structure and the velocity, thickness, and flexural strength of the ice. The results are presented in the form of ice forces on sloping and vertical structures with different geometries.

MP 1607 DYNAMIC BUCKLING OF FLOATING ICE

DYNAMIC BUCKLING OF FLOATING ICE SHEETS.
Sodhi, D.S., International Conference on Port and Ocean Engineering under Arctic conditions, 7th, Helsinki, Finland, April 5-9, 1983. Proceedings, Espoo, Finland, Valtion teknillinen tutkimuskeskus, 1983, p.822-833, 6 refs.
37-3780

PLOATING ICE, ICE PRESSURE, ICE LOADS, DYNAMIC LOADS, ICE ADHESION, ICE SHEETS, VELOCITY.

SHEBIS, VELOCITY.

Experimental and analytical studies have been conducted to investigate the effect of ice velocity on the buckling loads of floating ice sheets. An analysis of dynamic buckling of a floating ice beam has been conducted for the case when one end of the beam moves at a constant velocity suddenly from rest. Good agreement has been obtained between the results of analytical and experimental studies on the dynamic buckling of floating ice beams.

OBSERVATIONS OF PACK ICE PROPERTIES IN THE WEDDELL SEA.

Ackley, S.F., et al, Antarctic journal of the United States, 1982, 17(5), p.105-106, 4 refs. Smith, S.J., Clarke, D.B.

37-3962 PACK ICE, ICE CONDITIONS, SEA ICE DISTRI-BUTION, WEDDELL SEA.

BUTION, WEDDELL SRA.
Observations of pack ice in the Weddell Sea during the Weddell Polynya expedition (WEPOLEX-81) culminated in a daily map of ice conditions and a narrative observation log. The narrative log contains information on ice concentration, ridging, amounts of thin ice and open water, and unusual ice features. On the basis of observations, the pack ice zone has been divided into three regions ice edge region (within 0 to 60 naut. mi. of the northern limit of pack ice); ice edge-pack ice transition zone (within 60 to 160 naut. mi. of the outer limit of pack ice); and deep pack (at distances greater than 160 naut. mi. from the outer limit). In most satellite microwave images the ice edge-pack ice transition zone eppears as an area of lesser concentration. Observations did not confirm this. Also unexpected was the observation that noticeable swell propagation occurred at great distances from the outer pack limit.

MP 1609 PHYSICAL, CHEMICAL AND BIOLOGICAL PROPERTIES OF WINTER SEA ICE IN THE WEDDELL SEA.

Clarke, D.B., et al, Antarctic journal of the United States, 1982, 17(5), p.107-109, 11 refs. Ackley, S.F. 37-3963

SEA ICE. ICE COMPOSITION, ICE STRUCTURE, ALGAE, WEDDELL SEA

ALGAB, WEDDELL SEA.

Twenty of 27 ice cores and 13 surface ice samples taken between 59 deg 21 min S and 62 deg S have been analyzed for ice structure, salinity, nutrients, fluorescence, chlorophyll a, phaeo-pigment, diatom species enumeration, and becteria. The primary physical feature is the dominance of frazil ice structure as opposed to congelation ice. The salinity range is 2.4 to 13.7% with the higher salinities within the upper 15 cm. Chemical sualysis of nutrients in the cores indicates that they do not follow a dilution curve. Silicate, phosphate, and nitrate are found in higher concentrations in the adjacent surface than in the adjacent surface water. Evels, however, are two to five times higher in the surface layer of the ice cores than in the adjacent surface water. Chlorophyll a followed a pattern similar to that of nitrite. Phaeo-pigment ranged from 0.04 to 4.02 mg/cu m. Meltwater fluorescence appears to acale with salinity. Diatoms are present at all sample levels in the ice cores, but in varying concentration and condition. Active growth occurs in the surface layers.

ATMOSPHERIC BOUNDARY LAYER MEAS-UREMENTS IN THE WEDDELL SEA.

Andreas, E.L., Antarctic journal of the United States, 1982, 17(5), p.113-115, 4 refs.

ICE CONDITIONS, SEA ICE, WEDDELL SEA. ICE CONDITIONS, SEA ICE, WEDDELL SEA. There was a very intensive atmospheric boundary layer sampling program carried out on the Mikhail Somov during the joint U.S.-U.S.S.R. Weddell Polynya Expedition. This program included upper-air soundings with two different radiosonde systems; surface-layer profiling with a boom instrumented at three levels; spectral measurements of surface-layer turbulence with fast responding velocity, temperature, and humidity sensors; and routine meteorological observations. This paper describes the instrumentation used for the measurements and presents some of the surface-layer temperature and dew-point profiles.

MP 1611 ARCTIC AND SUBARCTIC ENVIRONMENTAL ARCTIC AND SUBARCTIC ENVIRONMENTAL ANALYSES UTILIZING ERTS-1 IMAGERY. Anderson, D.M., et al, U.S. National Aeronautics and Space Administration. Contractor report, Aug. 23, 1973, NASA-CR-135523, 5p. McKim, H.L., Haugen, R.K., Gatto, L.W., Slaughter, C.W., Mariar, T. 28-2984

REMOTE SENSING, ENVIRONMENTS, ERTS IMAGERY.

MP 1612

MP 1012
HEAT AND MOISTURE FLOW IN FREEZING
AND THAWING SOILS—A FIELD STUDY.
Berg, R.L., Conference on soil-water problems in cold
regions, Calgary, Alberts, Canada, May 6-7, 1975,
Proceedings, 1975, p.148-160, 14 refs. 30-3338

ROADS, FROST HEAVE, FROZEN GROUND MECHANICS, MEASURING INSTRUMENTS, MATHEMATICAL MODELS.

MATHEMATICAL MODELS.
The USACRREL Pavements Research Group has recently initiated a project to more adequately model the mechanism of frost heaving in soil-water systems. The project has three primary objectives: 1. Develop mathematical models incorporating heat flow, moisture flow and processes in the freezing zone, 2. Develop the necessary laboratory equipment and procedures to evaluate the required factors and to refine the mathematical models, 3. Develop adequate instrumentation and optimize locations of sensors for full scale field tests; install this instrumentation in test sections and obtain data necessary to validate the mathematical models.

MAP 1612

MP 1613

MP 1013
STUDY OF CLIMATIC ELEMENTS OCCUR-RING CONCURRENTLY,
Bilello, M.A., International Geographical Congress,
23rd, Moscow, July-Aug. 1976, Proceedings. Vol.2, 23rd, Moscow, July-Aug. 1976, Proceedings. Moscow, 1976, p.23-30, In English.

31-1536 CLIMATOLOGY, LONG RANGE FORECAST-ING, CLIMATIC CHANGES.

MP 1614 USE OF COMPRESSED AIR FOR SUPER-COOLED FOG DISPERSAL.

Weinstein, A.I., et al, Journal of applied meteorology, Nov. 1976, 15(11), p.1226-1231, For another version of this paper see 31-1494. 8 refs. Hicks, J.R. 21 1600.

31-1600

SUPERCOOLED FOG, FOG DISPERSAL, WEATHER MODIFICATION, ICE CRYSTAL FORMATION, COMPRESSED AIR.

FORMATION, COMPRESSED AIR.

Experiments have been performed under controlled and free environment conditions to determine the technical feasibility of using the cooling resulting from the adiabatic expansion of compressed air to initiate ice crystal production in a supercooled fog. These experiments have shown that for most supercooled temperatures, approximately 1000 cc of ir when compressed to 60 paig and released through a supersonic nozzle will produce the same number of ice crystals as does the evaporation of 1 cc of liquid propane. It is estimated that a compressed air supercooled fog dispersal system would consume approximately 6% of the hydrocarbon fuel presently consumed by operational systems using liquid propane spray.

MP 1615

MP 1615 APPLICATION OF ICE ENGINEERING AND RESEARCH TO GREAT LAKES PROBLEMS. Preitag, D.R., Federal Conference on the Great Lakes, lst, Ann Arbor, Mich., Dec. 13-15, 1972. Proceedings. (Washington), Environmental Protection Agency, 1972), p.131-138.
31-1736

31-1736
ICE BOOMS, ICE COMPRESSION, PILES, ICE CONTROL, ICE DISTRIBUTION, FREEZING POINTS, ENGINEERING, RESEARCH PROJECTS, UNITED STATES—GREAT LAKES. MP 1616

SOME ELEMENTS OF ICEBERG TECHNOLO-

Weeks, W.F., et al, International Conference and Workshops on Iceberg Utilization for Fresh Water Production, Weather Modification, and Other Applications, 1st, Iowa State University, Ames, October 2-6, 1977. Proceedings. Edited by A.A. Husseiny, New York, Pergamon Press, 1978, p.45-98, 51 refs. Mellor, M. 32-4714

ICEBERGS, ICE MECHANICS, ICE PHYSICS, ICE SHELVES, WATER SUPPLY, ICEBERG TOWING.

Many of the technical questions relating to iceberg transport are given brief, but quantitative, consideration. These include iceberg genesis and properties, the mechanical stability of icebergs at sea, towing forces and tug characteristics, drag coefficients, ablation rates, and handling and processing the iceberg at both the pick-up site and at the final destination.

In particular, the paper attempts to make technical information on glaciological and ice engineering aspects of the problem more readily available to the interested planner or engineer.

MP 1617

ICE AND SHIP EFFECTS ON THE ST. MARYS RIVER ICE BOOMS.

Perham, R.E., Canadian journal of civil engineering, June 1978, 5(2), p.222-230, 7 refs. See also 31-3424.

ICE BOOMS, ICE PRESSURE, ICE CONTROL, IMPACT STRENGTH, ICE LOADS, LOADS (FORCES), ICE NAVIGATION, RIVER ICE.

NUMERICAL SIMULATION OF AIR BUBBLER SYSTEMS.

Ashton, G.D., Canadian journal of civil engineering, June 1978, 5(2), p.231-238, 8 refs. See also 31-3438.

39-202 BUBBLING, ICE PREVENTION, ICE CONTROL, HEAT TRANSFER, MECHANICAL ICE PRE-VENTION, ANALYSIS (MATHEMATICS), EQUIPMENT.

MP 1619

DYNAMICS OF NEAR-SHORE ICE.

Kovaca, A., et al. Environmental assessment of the Alaskan continental shelf, Vol.2 Principal investigators' reports July-Sep. 1978. Boulder, Colorado, Environmental Research Laboratories, 1978, p.230-233. Weeks, W.F.

33-3095 SEA ICE, FAST ICE.

The authors report briefly on a new ice pile-up southeast of Pt. Barrow and the status of various reports connected with their current studies.

MP 1620

ANISOTROPIC PROPERTIES OF SEA ICE IN THE 50-150 MHZ RANGE.

Kovacs, A., et al, Environmental assessment of the Royacs, A., et al, Environmental assessment of the Alaskan continental shelf, Vol. 8, Transport. Principal investigators' annual reports for the year ending March 1979, Boulder, Colorado, Outer Continental Shelf Environmental Assessment Program, Oct. 1979, p.324-353, For another source see 34-963. 4 refs. Morey, R.M. 34-3054

34-3054
SEA ICE, ICE ELECTRICAL PROPERTIES,
ANISOTROPY, ICE CRYSTAL STRUCTURE,
ELECTROMAGNETIC PROPERTIES, OCEAN
CURRENTS, REMOTE SENSING.

CURRENTS, REMOTE SENSING.

Results of impulse radar studies of sea ice near Prudhoe Bay, Alaska, show that where there is a preferred current direction under the ice cover the crystal structure of the ice becomes highly ordered. This includes a crystal structure with a preferred horizontal c-axis that is oriented parallel with the local current. The radar studies show that this structure behaves as an anisotropic dielectric. The result is that when electromagnetic energy is radiated from a dipole antenna in which the E-field is oriented perpendicular with the c-axis azimuth, no bottom reflection is detected. It was also found that the frequency dispersion of anisotropic sea ice varies in the horizontal plane and is related to the average bulk brine volume of the ice. The bulk dielectric constant of the ice, as determined from impulse travel time, shows little correlation with the coefficient of anisotropy.

SOUTH POLE ICE CORE DRILLING, 1981-1982. Kuivinen, K.C., et al, Antarctic journal of the United States, 1982, 17(5), p.89-91, 7 refs.

Koci, B.R., Holdsworth, G.W., Gow, A.J.

DRILLING, ICE CORING DRILLS, ICE CORES, ANTARCTICA—AMUNDSEN-SCOTT STA-

TION.

A cooperative ice core drilling, core processing, and stratigraphic logging program was conducted at Amundsen-Scott Station during the 1981-82 season by investigators from the Polar Ice Coring Office (PICO), the National Hydrology Research Institute Buvironment Canada (NHRR), and the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL). A 202.4-m ice core was collected, logged and packaged in the field, and then shipped to the CRREL ice core storage facility, where it will be made available to the NSF sponsored gisciologists for further analysis. In addition to work with the ice core, PICO team members collected three gas samples for the Physics Inst., Univ. of Bern, Switzerland and prepared the Gearhardt-Owen logging winch for use by Univ. of Wisconsin-Madison geophysicists in their sonic logging of the 900-m borehole at Dome C.

MP 1622 CONTINUUM SEA ICE MODEL FOR A GLO-BAL CLIMATE MODEL.

Ling, C.H., et al, Sea ice processes and models. Rdited by R.S. Pritchard, Seattle, University of Washington Press, 1980, p.187-196, 20 refs.
Rasmussen, L.A., Campbell, W.J.

35-2169

SEA ICE, DRIFT, ICE CONDITIONS, MATH-EMATICAL MODELS, REMOTE SENSING, ICE MELTING, FREEZING, MICROWAVES, CLI-MATE, MAPPING, RADIOMETRY, WEDDELL

SEA.

The model developed by Campbell (1965) has been extended to a time-dependent, quasi-steady-state model that uses both the equation of continuity and the equation of momentum. It also incorporates an equation of state that relates the pressure of ice to its convergence. The constitutive equation is of a fluid type. The freezing and melting of sea ice is parameterized in terms of ice thickness, location, and season. For the 1974 sustral winter twice-daily surface wind stress fields were generated from synoptic pressure data. For every third day of this period the boundaries and concentration of the Antarctic sea ice were mapped using ESMR (Electronically Scanning Microwave Radiometer) images acquired by the Nimbus-5 satellite. These data are used both as initial conditions and to compare the model results for various time periods.

REVIEW OF ELECTRICAL RESISTIVITY OF FROZEN GROUND AND SOME ELECTROMAGNETIC METHODS FOR ITS MEASURE-MENT.

Arcone, S.A., Materials performance, 1979, 18(5), p.32-37, 16 refa.

33-4231
PROZEN GROUND PHYSICS, ELECTRICAL
RESISTIVITY, ELECTROMAGNETIC PROSPECTING, GEOPHYSICAL SURVEYS, RADIO
WAVES, SOIL MOISTURE CONTENT, SOIL
TEMPERATURE, GRAIN SIZE, AIRBORNE RADAR, MEASURING INSTRUMENTS.

Results of extensive studies of earth resistivities of low temps ture soils are presented. Ground measurements of telectromagnetic field components of radio waves propagat at low frequencies from distant transmitters and of the induction at low frequencies from distant transmitters and of the inductive coupling between two loop antennas are described. Results of measurements by these methods are compared with each other and with actual findings from excavations and borings at permatrost sizes. The measurements are abown to provide data on locations of lens ice, indicate zones of thawing give indications which permit estimating resistivities of layers and permit construction of a map of Alaska identifying major resistivity zones. Airborne evaluation of remotely propagated waves permits construction of resistivity contour maps. Reasons for variations in resistivity among various categories of frozen soils are discussed.

MP 1624

THERMAL AND RHEOLOGICAL COMPUTA-TIONS FOR ARTIFICIALLY FROZEN GROUND CONSTRUCTION.

SANGER, F.J., et al., International Symposium on Ground Freezing, 1st, Bochum, Mar. 8-10, 1978, Vol.2. Edited by H.L. Jessberger, Bochum, Ruhr University, 1978, p.95-117, 32 refs. Sayles, F.H. 33-4283

33-4283
SOIL FREEZING, THERMAL PROPERTIES, ARTIFICIAL FREEZING, FROZEN GROUND MECHANICS, FROZEN GROUND THERMODYNAMICS, CREEP PROPERTIES, RHEOLOGY, CONSTRUCTION, ANALYSIS (MATHEMATICS), FROST HEAVE.

MP 1625

ON FORECASTING MESOSCALE ICE DYNAM-

ICS AND BUILD-UP.
Hibler, W.D., III, et al, Annals of glaciology, 1983, Vol.4, p.110-115, 10 refs.
Udin, I., Ullerstig, A.

37-4089

J7-4089 ICE PILEUP, ICE MECHANICS, ICE LOADS, ICE SOLID INTERFACE, WAVE PROPAGATION, OFFSHORE STRUCTURES, SHORES, ICE FORE-CASTING, SEA ICE, ICE COVER STRENGTH, ICE COVER THICKNESS, MATHEMATICAL MODELS.

MODELS.

Due to the nonlinear nature of the ice interaction, sessioe build-up against coasts and structures is a complex process. This build-up significantly affects mesoscale (10 to 100 km) ice motions over typical forecast time scales of several days. To examine the ramifications of assuming a non-linear ice interaction in ice forecast models, we have carried out a series of idealized simulations employing a viscous plastic seas-ice rheology. These simulations employ constant wind fields at a grid resolution of 12.5 km and allow the ice to build up and strengthen.

With the plastic ice interaction the ice build-up is found to take place by means of a ridging front.

Depending on the nature of the strength-

thickness coupling, this build-up is accompanied by kinen wave propagation effects.

MP 1626

EXPERIMENTAL DETERMINATION OF THE BUCKLING LOADS OF FLOATING ICE SHEETS

Sodhi, D.S., et al, Annals of glaciology, 1983, Vol.4, p.260-265, 12 refs.
Haynes, F.D., Kato, K., Hirayama, K.

FLOATING ICE, ICE LOADS, STRUCTURES, ICE SOLID INTERFACE, ICE SHEETS, ICE PRESSURE, EXPERIMENTATION, PHOTOGRAPHY. Experiments were performed to determine the forces required to buckle a floating ice sheet pushing against atructures of different widths.

The characteristic length of each ice sheet was determined to enable a comparison to be made between the theoretical and experimental results.

MP 1627

EXPERIMENTS ON ICE RIDE-UP AND PILE-

UP. Sodhi, D.S., et al, Annals of glaciology, 1983, Vol.4, p.266-270, 48 refs. Hirayama, K., Haynes, F.D., Kato, K.

ICE PILBUP, FLOATING ICE, STRUCTURES, ICE SOLID INTERFACE, ICE OVERRIDE, SHORES, BEACHES, SLOPE ORIENTATION, EXPERIMENTATION.

not push up and non-up are common occurrences along beaches in the sub-Arctic and Arctic. An understanding of the factors which lead to pile-up is important for design of a defensive strategy to prevent damage to coastal installations. Since ice action on a aloping beach is complex, an experimental model study was undertaken to determine the factors which promote ice pile-up. The factors varied in this study were the freeboard, slope, and roughness of the beach. One experiment was performed to observe the effectiveness of a shore defense structure against ice ride-up.

MP 1628 Ice pile-up and ride-up are common occurre in the sub-Arctic and Arctic. An unc MP 1628

ROOF MOISTURE SURVEYS: CURRENT STATE OF THE TECHNOLOGY.
Tobiasson, W., Society of Photo-Optical Instrumentation Engineers. Proceedings, 1983, Vol.371, p.24-31, 7 refs.

ROOFS, MOISTURE DETECTION, INFRARED RECONNAISSANCE, MEASURING INSTRU-MENTS

MBNTS.

Moisture is the big enemy of compact roofing systems. Nondestructive nuclear, capacitance and infrared methods can
all find wet insulation in such roofs but a few core samples
are needed for verification. Nuclear and capacitance surveys
generate quantitative results at grid points but examine only
a small portion of the roof. Quantitative results are not
usually provided by infrared scanners but they can rapidly
examine every square inch of the roof. Being able to
find wet areas when they are small is an important advantage. MP 1629

Transport of water in frozen soil EXPERIMENTAL DETERMINATION OF SOIL-WATER DIFFUSIVITY UNDER ISOTHERMAL

WATER DIFFUSIVITY UNDER ASSUMENTABLE CONDITIONS.
Nakano, Y., et al., Advances in water resources, Dec. 1982, 5(4), p.221-226, For Part 2 of this study (MP 1601), see 37-3558. 13 refs.
Tice, A.R., Oliphant, J.L., Jenkins, T.F.
37-4218
SOIL WATER MIGRATION, FROZEN GROUND SUPPLIES ADDITION ICE SOIL FREEZING.

PHYSICS, GROUND ICE, SOIL FREEZING.

A new experimental method for measuring the soil-water diffusivity of frozen soil under isothermal conditions is introduced. The theoretical justification of the method is presented and the feasibility of the method is demonstrated by experiments conducted using marine deposited clay. The measured values of the soil-water diffusivity are found comparable to reported experimental data. (Auth.)

MP 1630 ACOUSTIC EMISSIONS IN THE INVESTIGA-TION OF AVALANCHES.

St. Lawrence, W.F., Canadian Geotechnical Conference, 29th, Vancouver, B.C., 1976. Proceedings, Canadian Geotechnical Society, 1977, p.VII/24-VII/33, In English with French summary. 4 refs. 33-1598

SNOW DEFORMATION, ULTRASONIC TESTS, AVALANCHE MECHANICS, SNOW ACOUSTICS, SNOW COVER STABILITY.

MP 1631

NOTES AND QUOTES FROM SNOW AND ICE OBSERVERS IN ALASKA.

UBSERVERS IN ALASEA.
Bilello, M.A., Western Snow Conference. Proceedings, 1979, 47th, p.116-118.
38-104
SNOW SURVEYS, ICE SURVEYS, COST ANALYSIS, ORGANIZATIONS, UNITED STATES—

MP 1632 RELATIONSHIP BETWEEN THE ICE AND UN-FROZEN WATER PHASES IN FROZEN SOILS AS DETERMINED BY PULSED NUCLEAR RESONANCE AND PHYSICAL DESORPTION DATA.

Tice, A.R., et al, Journal of glaciology and cryopedology, 1983, 5(2), p.37-46, In Chinese with English summary. For another version see 37-48, 14 refs. Oliphant, J.L., Zhu, Y., Nakano, Y., Jenkins, T.F.

38-180

38-180
UNFROZEN WATER CONTENT, SOIL WATER, ICE WATER INTERFACE, GROUND ICE, FROZEN GROUND TEMPERATURE, FROZEN GROUND PHYSICS, NUCLEAR MAGNETIC RESONANCE, CLAY SOILS.

An experiment is described that demonstrates the balance between the ice and the unfrozen water in a frozen soil as water is removed. Nuclear magnetic resonance (NMR) is used to monitor the unfrozen water content as the soil is dehydrated by a molecular sieve material. Our results show that the unfrozen water content of a Morin clay soil remains constant until the total water content has been reduced to the point where no ice remains in the system.

MP 1633
MECHANISMS FOR ICE BONDING IN WET SNOW ACCRETIONS ON POWER LINES.
Colbeck, S.C., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1983, 83-17, p.25-30, 9 refs. Ackley, S.F. 38-427

38-427
POWER LINE ICING, ICE ADHESION, WET
SNOW, ICE FORMATION, SNOW ACCUMULATION, PHASE TRANSFORMATIONS, GRAIN
SIZE, TEMPERATURE EFFECTS.

MP 1634 HOW EFFECTIVE ARE ICEPHOBIC COAT-

Minsk, L.D., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1983, 83-17, p.93-95, 2 refs.

38-435 PROTECTIVE COATINGS, ICE CONTROL, ICE PREVENTION, ICING, SHEAR STRENGTH, ICE STRENGTH, SURFACE PROPERTIES, ICE ADHESION, COUTERMEASURES, TESTS.

ADHESION, COUTERMEASURES, TESTS.
Much effort over many years has gone into the search
for an effective, durable, easily applied and inexpensive material
to eliminate the force of adhesion between ice and a substrate.
The objective of zero ice adhesion on an unheated surface
which would either prevent the formation of ice or ensure
self-shedding of very thin accretions has not yet been achieved.
Many commercially-available coexities do succeed in reducing
the force of adhesion below 15 psi (1034 kPs) and survive
at least five freeze-release cycles, two arbitrarily established
criteria. Exposure to rain erosion, however, increases the
force of adhesion beyond this value for most materials.
As part of a continuing project at CREEL, a test procedure
for measuring the shear strength of ice at failure has been
developed and a large number of candidate materials have
been tested.

MP 1635

NAT 19.35
STUDIES OF HIGH-SPEED ROTOR ICING
UNDER NATURAL CONDITIONS.
Itagaki, K., et al, U.S. Army Cold Regions Research
and Engineering Laboratory. Special report, June
1/83, 83-17, p.117-123, 2 refs.
Lemieux, G.E., Bosworth, H.W., O'Keefe, J., Hogan,

38-438 AIRCRAFT ICING, FREEZING NUCLEI, PRO-PELLERS, HELICOPTERS, TESTS.

PELLERS, HELICOPTERS, TESTS.

Icing on high-speed rotors was studied under natural conditions on the summit of Mt. Washington. Differences in the growth conditions from those of laboratory tests, such as rapidly variable water supplies and abundant freezing nuclei, seem to have contributed to raising the temperature of the wet growth regime and producing finer crystals than in laboratory armselments.

APPLICATION OF A BLOCK COPOLYMER SO-LUTION TO ICE-PRONE STRUCTURES. Hanamoto, B., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1983, 83-17, p.155-158, 1 ref.

icing, Channels (Waterways), Locks (Waterways), Protective Coatings, ICE PREVENTION, POLYMERS, ICE NAVIGATION, ICE ADHESION, COUNTERMEASURES.

MP 1637 FIELD MEASUREMENTS OF COMBINED ICING AND WIND LOADS ON WIRES.
Govoni, J.W., et al, U.S. Army Cold Regions Research

and Engineering Laboratory. 1983, 83-17, p.205-215, 8 refs. Ackley, S.F. 38-449 Special report, June

POWER LINE ICING, ICE ACCRETION, ICE LOADS, WIND PRESSURE, WIND DIRECTION, WIND VELOCITY, POWER LINE SUPPORTS.

WIND VELOCITY, POWER LINE SUPPORTS. Rour winter field seasons of simulated power line icing data were obtained during the years 1977-1981. Measurements were obtained of the icing characteristics, loads on the wire, and wind conditions simultaneously. Loads were measured using a single-axis load cell in line with the wire during the first three seasons, and a tri-axial load cell (resolving three perpendicular force components) in the 1980-81 winter season. Winds were measured using a vaned pitot-static tube located near one end of the wire.

MP 1638
LANDSAT DIGITAL ANALYSIS OF THE INITIAL RECOVERY OF THE KOKOLIK RIVER TUNDRA FIRE AREA, ALASKA.
Hall, D.K., et al, U.S. National Aeronautics and Space Administration Technical memorandum, Dec.

1979, No.80602, 15p., 7 refs. Ormsby, J.P., Johnson, L., Brown, J.

TUNDRA, FIRES, REVEGETATION, REMOTE SENSING, LANDSAT, UNITED STATES—ALAS-KA—KOKOLIK RIVER.

MP 1639 SURVEY OF METHODS FOR SOIL MOISTURE DETERMINATION.

DELECTRINATION.
Schmugge, T.J., et al, U.S. National Aeronautics and Space Administration. Technical memorandum, Nov. 1979, No. 80658, 74p., Refs. p. 45-60.
Jackson, T.J., McKim, H.L.
38-484

38-484
SOIL WATER, REMOTE SENSING, GRAVIMETRIC PROSPECTING, ELECTROMAGNETIC
PROSPECTING, EVAPOTRANSPIRATION,
VEGETATION FACTORS, PRECIPITATION (METEOROLOGY).

MP 1640 GUIDEBOOK TO PERMAPROST AND RELAT-ED FEATURES ALONG THE ELLIOTT AND DALTON HIGHWAYS, FOX TO PRUDHOE BAY, ALASKA.

BAY, ALASKA.
Brown, J., ed, International Conference on Permafrost,
4th, July 18-22, 1983, Fairbanks, University of Alaska,
(1983), 230p., Guidebook No.4. Refs. p.213-225.
Kreig, R.A., ed.
38-521
PERMAFROST PHYSICS, MANUALS, ROADS,
ECOLOGY, CLIMATOLOGY, HYDROLOGY,
VEGETATION, GEOLOGY, GROUND ICE,
UNITED STATES—ALASKA.

MP 1641 MEASUREMENT OF ICE FORCES ON STRUC-TURES.

Sodhi, D.S., et al, Design for ice forces. Edited by S.R. Caldwell and R.D. Crissman, New York, N.Y., American Society of Civil Engineers, 1983, p.139-155,

Haynes, F.D. 38-598

ICE LOADS, ICE PRESSURE, OFFSHORE STRUCTURES, IMPACT STRENGTH, ICE STRENGTH, RIVER ICE, LAKE ICE, ICE MECHANICS, STRAINS, TIME FACTOR, MEASUR-ING INSTRUMENTS.

ING INSTRUMENTS.

Methodologies and techniques are discussed for measuring ice forces on fixed structures situated in rivers and lakes. The usual method of measuring ice forces is to place a load frame between the moving ice and the structure and to measure the reactive forces with load cells or strain gages. Another method is to measure the acceleration, displacement or strain at a few points on the test structure and relate the measurements to ice forces. The size and shape of the force measuring system depend upon the mode of ice failure, the distribution of the ice forces and the logistics associated with each site. The variations of ice force with respect to time are generally very high during crushing and impact, and the response of the force-measuring system should be sufficiently fast.

MP 1642

METHODS OF ICE CONTROL.

Frankenstein, G.B., et al, Design for ice forces. Edited by S.R. Caldwell and R.D. Crissman, New York, N.Y., American Society of Civil Engineers, 1983, p.204-215, 7 refs.

Hanamoto, B.

38-602

38-002
ICE LOADS, ICE CONTROL, ICE NAVIGATION,
LOCKS (WATERWAYS), CHANNELS (WATERWAYS), ICEBREAKERS, CHEMICAL ICE PREVENTION, ICE REMOVAL, ELECTRICAL
MEASUREMENT, AIR CUSHION VEHICLES,
PROTECTIVE COATINGS.

Methods of ice control in navigable waters including locks are presented. Ice carried downstream by ship traffic causes operational problems in and around the lock areas as well as in restricted channels. The paper discusses chemical, electrical, and mechanical methods of ice control. The use of air cushion vehicles and ice breaking ships for ice control is also discussed.

MP 1643 ICE ACTION ON TWO CYLINDRICAL STRUC-

Kato, K., et al, Offshore Technology Conference, 15th, Houston, Texas, May 2-5, 1983. Proceedings. Vol.1, 1983, p.159-166, 17 refs. Sodhi, D.S.

38-641 ICE LOADS, STRUCTURES, ICE PRESSURE, ICE SOLID INTERFACE, EXPERIMENTATION, PIPES (TUBES).

FIFES (TUBES).

Ice action on two cylindrical structures, located side by side, has been investigated in a small-scale experimental study to determine the interference effects on the ice forces generated during loc structure interaction. The proximity of the two structures changes the mode of ice finhure, the magnitude and direction of ice forces on the individual structure, and the dominant frequency of ice force variations. Interference effects were determined by comparing the experimental results of tests at different structure spacings.

MP 1644
ICE JAMS IN SHALLOW RIVERS WITH FLOODPLAIN FLOW.
Calkins, D.J., Canadian journal of civil engineering, Sep. 1983, 10(3), p.538-548, 14 refs.

38-776
ICE JAMS, RIVER ICE, RIVER FLOW, ICE CONDITIONS, ICE COVER THICKNESS, FLOATING ICE, HYDRAULICS, FLOODS, PLAINS, COMPUTER APPLICATIONS.

PUTER APPLICATIONS.

The equilibrium ice jam thickness given by Pariset et al, is modified to yield a clearer, consistent relationship between the flow hydraulics and thickness. The modified equations are analyzed with respect to a floating ice jam in the main channel with flow also occurring in the floodplain. The final derivation allows the expected ice jam thickness to be computed, given the bed and ice cover thickness. The analytical computation for the ice jam thicknesses is compared with prototype data on ice jam thicknesses from four shallow rivers which had significant floodplain flow with the ice iam event.

ASYMMETRIC PLANE FLOW WITH APPLICA-TION TO ICE JAMS.
Tatinclaux, J.C., et al, Journal of hydraulic engineer-ing, Nov. 1983, 109(11), p.1540-1556, 17 refs. Gogds, M. 38-1629

JOSTON STREET STATES THE STEAR STRESS, FRICTION, SURFACE ROUGHNESS, VELOCITY, ANALYSIS (MATHEMATICS), TURBULENT FLOW.

BULENT FLOW.

An available turbulence method is used to prove that in plane flows between two boundaries with asymmetric roughness the plane of maximum velocity is not the plane of zero shear stress. By dividing the flow at the plane of zero shear stress, laboratory and field data on flows below simulated and actual ice jams are analyzed to derive equations for the boundaries triction factors in terms of mean flow velocity, depth of flow zone, and boundary roughness for smooth and fully rough boundaries. These equations are applied to the calculations of ice jam characteristics. For the jams studied, the present method gives a variation of about 10% in the jam characteristics with a method based on dividing the flow at the plane of maximum velocity.

MP 1646 OPTICAL ENGINEERING FOR COLD ENVI-

OPTICAL ENGINEERING FUR COLD ENVI-RONMENTS.
Aitken, G.W., ed, Society of Photo-Optical In-strumentation Engineers. Proceedings, 1983, Vol.414, Meeting on Optical Engineering for Cold En-vironments, Arlington, VA, April 7-8, 1983. Pro-ceedings, 225p., Refs. passim. For selected papers see 38-1032 through 38-1057.

COLD WEATHER PERFORMANCE, SPECTROS-COPY. LOW TEMPERATURE RESEARCH, REMOTE SENSING, WAVE PROPAGATION, MEASURING INSTRUMENTS, ENGINEERING,

TECHNIQUE FOR MEASURING THE MASS CONCENTRATION OF FALLING SNOW.

Lacombe, J., Society of Photo-Optical Instrumenta-tion Engineers. Proceedings, 1983, Vol.414, p.17-28, 38-1035

SNOWFALL, MEASURING INSTRUMENTS, PRECIPITATION GAGES, VELOCITY, ELECTROMAGNETIC PROPERTIES, ANALYSIS (MATHEMATICS).

(MATHEMATICS).
A system has been developed by the U.S. Army Cold Regions Research and Engineering Laboratory to measure the mass concentration of falling anow crystals. It is known as ASCME (Airborne Snow Concentration Measuring Equipment) and is described in this paper.

ASCME's general performance has been evaluated based on concurrent measurements of precipitation rate.

A strong correlation between airborne-snow mass concentration and precipitation rate yields an estimate of particle full velocity close to that observed by other researchers.

Factors affecting system accuracy have been investigated and are discussed.

Examples are given of the utilization of ASCME data in analyses of electromagnetic energy propagation in falling anow. (Author) agnetic energy propagation in falling anow.

MP 1648 CHARACTERIZATION OF SNOW FOR EVALUATION OF ITS EFFECT ON ELECTRO-MAGNETIC WAVE PROPAGATION.

Berger, R.H., Society of Photo-Optical Instrumenta-tion Engineers. Proceedings, 1983, Vol.414, p.35-42, 9 refs. 38-1037

SNOWFALL, SNOWFLAKES, ELECTROMAG-NETIC PROPERTIES, PARTICLE SIZE DISTRI-BUTION, SPECTROSCOPY, MEASURING IN-STRUMENTS, SNOW CRYSTALS, TURBULENT BOUNDARY LAYER.

Snow as an obscurant presents some interesting challenges to those attempting to characterize it. The wide range of particle sizes which can be present at any instant, and the intricate and varied particle geometry, which makes particle orientation an important consideration in snow characterization and extinction measurements, both call for the use of special orientation an important consideration in show characterization and extinction measurements, both call for the use of special measurement techniques. The application of particle size spectrometer probes to the measurement of distributions and area concentrations for snow crystals and flakes in the 12.5-to 6200-micron size range is described. (Auth.)

MP 1649
PROGRESS IN METHODS OF MEASURING
THE FREE WATER CONTENT OF SNOW.
Fisk, D.J., Society of Photo-Optical Instrumentation
Engineers. Proceedings, 1983, Vol.414, p.48-51, 3 refs. 38-1039

WATER CONTENT, SNOW ELECTRI-SNOW WATER CUNTENT, SNOW BLECTAL
CAL PROPERTIES, MEASURING INSTRUMENTS, SNOW COVER EFFECT, ELECTROMAGNETIC PROPERTIES, SNOW MELTING,
BACKSCATTERING, ABSORPTION, WAVE
PROPAGATION, FREEZE THAW CYCLES.

PROPAGATION, FREEZE THAW CYCLES.

Providing ground truth for the backscatter and absorption effects of a snow cover on electromagnetic waves has long seen a problem. One characteristic of the snow cover which has been particularly difficult to measure is its free, or liquid, water content—the fraction of the snow's volume which exists in the liquid state. Five methods which have been used for measuring this parameter are described and their merits and deficiencies are discussed. Two of the methods are calorimetric, measuring the free water content as a function of the heat added to or removed from a snow sample while completely melting or freezing it. The third uses the treezing point depression observed on adding a salt solution to a snow sample to calculate the snow's free water content. In the fourth procedure, a snow sample is completely dissolved in ethyl or methyl alcohol. The corresponding decrease in temperature is inversely related to the free water content of the snow. The final technique is electronic: above a certain frequency, the electrical capacitance of snow is related to its density and free water content. With accurate calibration, devices which measure snow capacitance are likely to be the simplest and fastest means of providing free water measurements. (Auth.)

MP 1650 COMMENTS ON THE METAMORPHISM OF SNOW.

Colbeck, S.C., Society of Photo-Optical Instrumenta-tion Engineers. Proceedings, 1983, Vol.414, p.149-151

38-1051

METAMORPHISM (SNOW), SNOWFALL, SNOW CRYSTAL GROWTH, GRAIN SIZE, TEMPERA-TURE GRADIENTS, CLIMATIC FACTORS, WET

SNOW.

Snow precipitation takes a variety of forms depending on the conditions in the atmosphere at the time of the snowfall. Regardless of what particular conditions prevail at that time, once the snow particles reach the ground they immediately begin changing. This is not surprising since the snow cover is at or close to its melting temperature, has a very conditions.

Wet snow and dry snow are very different atterials. They have different properties and even looked different. They have different properties and even looked different. They snow the different properties and even looked different they begin the processes. They are treated separately here. Dry snow is treated first because dry snowfall followed some time later by melting is the normal sequence of events. (Auth.)

MP 1651 LANDSAT-4 THEMATIC MAPPER (TM) FOR COLD ENVIRONMENTS.

COLID ENVIRONMENTS.

Gervin, J.C., et al, Society of Photo-Optical Instrumentation Engineers. Proceedings, 1983,
Vol.414, p.179-186, 28 refs.

McKim, H.L., Salomonson, V.V.
38-1054

38-1034
REMOTE SENSING, SPECTROSCOPY, SNOW COVER, ICE CONDITIONS, SNOW WATER CONTENT, TOPOGRAPHIC SURVEYS, LANDSAT, CLOUD COVER, MAPPING.

SAT, CLOUD COVER, MAPPING.

The TM aboard Landsat-4 launched on July 16, 1982, represents a major advance in Barth resources sensors. Its seven spectral bands record surface radiation in blue, green, red, near infrared, middle infrared and thermal wavelengths. The spatial resolution of approximately 30 meters represents a sevenfold increase over the previous Landsat sensor, the multispectral scanner subsystem (MSS). In addition, TM has greater radiometric sensitivity, distinguishing 256 quantization levels, compared with 64 for the MSS. These potential improvements have significant implications for satellite remote sensing in cold environments. The addition of the middle infrared bands will permit clouds to be distinguished from snow. It may also be possible to relate spectral response in this range to snow condition and hence water content. The thermal band responds to differences in surface temperature, which may be related to variations in soil moisture and drainage. These are important considerations for cold region construction. (Auth.)

EFFECT OF COLOR AND TEXTURE ON THE SURFACE TEMPERATURE OF ASPHALT CON-CRETE PAVEMENTS.

Berg, R.L., et al, International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.57-61, 11 refs.
Esch, D.C.
38-1110

38-110
PERMAPROST BENEATH ROADS, PAVE-MENTS, BITUMINOUS CONCRETES, SURFACE TEMPERATURE, WIND VELOCITY, PROTEC-TIVE COATINGS, TESTS.

TIVE COATINGS, TESTS.

During the fall of 1981 and the spring of 1982, eight test items were established on an asphalt pavement in Pairbanks, Alaska. The test items were: two sections of untreated pavement, yellow-painted pavement, white-painted pavement, yellow-painted pavement, white-painted pavement, standard' chip seal, fine-grained "standard" chip seal, chip seal with dark brown aggregate, and chip seal with white marble aggregate. The test items were located on a main road. Surface temperatures were monitored hourly by thermocouples attached to an automatic data collection system. The ambient air temperature, wind speed and direction, amount of precipitation, and radiation balance were continuously recorded at an untraffiched pavement approximately 100 m from the test items. Incident and reflected shortwave radiation measurements were made nearly every weekday over each test item using a hand-held radiometer. Nactors, ratios of surface thawing indexes to air thawing indexes varied from about 1.2-1.3 for the white- and yellow-painted surfaces, respectively, to about 1.4-1.5 for the other surfaces.

MP 1653 OBSERVATIONS ON ICE-CORED MOUNDS AT SUKAKPAK MOUNTAIN, SOUTH CENTRAL BROOKS RANGE, ALASKA.

DEUUS HANGE, ALASEA.
Brown, J., et al. International Conference on Permatrost, 4th, Pairbanks, Alaska, July 17-22, 1983. Proceedings. Washington, D.C., National Academy Press, 1983, p.91-96.

Nelson, F., Brockett, B.E., Outcalt, S.I., Everett, K.R. 38-1116

38-1116
FROST MOUNDS, TOPOGRAPHIC FEATURES,
GROUND ICE, UNFROZEN WATER CONTENT,
GBOMORPHOLOGY, PERMAFROST DISTRIBUTION, PERMAFROST HYDROLOGY,
SLOPES, MOUNTAINS, UNITED STATES—
ALASKA—SUKAKPAK MOUNTAINS.

ALASKA—SUKAKPAK MOUNTAINS.
Several hundred mounds occur on the lower slope of Sukakpak
Mountain. The mean mound height is approximately 1
m and most are elliptical or circular in plan. Clear, massive
ice can be found within, below, and adjacent to some mounds.
Within and adjacent to one mound, free water under low
pressure was observed in late winter. Prozen sediments
were found below the water lens. Prozen sediments
were found below the water lens. Prozen sediments
curvature on top of the mounds suggest long period
of stability. Most mounds are found in active drainage
channels that develop thick surface icings each winter. As
a tentative hypothesis, it is suggested that the mounds form
by closed-system freezing at sites with higher moisture contents
than their aurroundings. The causes and frequency of
occurrence and annual magnitude of this upheaving are under
investigation.

MP 1654
RUNOFF FROM A SMALL SUBARCTIC WATERSHED, ALASKA.
Chacho, E.F., et al, International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983.
Proceedings, Washington, D.C., National Academy
Press, 1983, p.115-120, 17 refs.
Bredthauer, S.
38-1120

38-1120

38-1120
PERMAPROST BENEATH RIVERS, RUNOFF,
STREAM FLOW, WATERSHEDS, DISCONTINUOUS PERMAPROST, SNOWMELT, PRECIPITATION (METEOROLOGY), MOSSES, SLOPES,
EVAPOTRANSPIRATION.

EVAPOTRANSPIRATION.

Precipitation-runoff ratios were measured on Glenn Creek, as mall, second-order, subarctic stream located near Fairbanka, Alaska, in the Yukon, Tanana Upland physiographic province. Glenn Creek drains a watershed of 2.25 sq km, of which 70% is underlain by permafrost.

A Paraball flume was used to measure streamflow, and a pair of 1.22 m by 2.44 m lysimeters were used to measure precipitation and runoff from the moss-covered permafrost alope. The data from one summer season (1979) and one snowmelt season (1980) indicate the aloping surfaces of the watershed have a very fast response time, long recession, and subsurface runoff prior to complete saturation of the overlying organic material. Glenn Creek streamflow is comparable to the lysimeter runoff with regard to response time and runoff recession, however the watershed precipitation-runoff ratio is much lower. This is attributed to longer travel distances in the watershed which result in greater evapotranspiration losses, little contribution from the non-permafrost areas, and only partial areas of the watershed contributing to the streamflow.

MP 1655

MP 1655

FROST HEAVE OF SALINE SOILS.

Chamberlain, E.J., International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.121-126, 8 refs.

SALINE SOILS, FROST HEAVE, SOIL CHEMISTRY, SOIL FREEZING, ICE LENSES, BRINES, SHEAR STRESS, TESTS.

SHEAR SIRESS, IESIS.

Theories of ice segregation and frost heave processes in saline soils are briefly examined and modified to explain observations made on clay and sand soils frozen under laboratory conditions. Seawater was observed to reduce the rate of frost heave by more than 50% for both soil types and to dramatically reduce the size of ice lenses. The effect of seawater is to cause the formation of a thick active freezing zone with many ice lens growth sites, each with its own brine concentration. Unbounded brine-rich soil zones between ice lenses are identified as potential zones of low shear strength.

MP 1656

LONG-TERM ACTIVE LAYER EFFECTS OF CRUDE OIL SPILLED IN INTERIOR ALASKA. CRUDE UIL SPILLED IN INTERIOR ALASKA. Collins, C.M., International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.175-179, 19 refs. 38-1131

OIL SPILLS, ACTIVE LAYER, ENVIRONMENTAL IMPACT, THAW DEPTH, ALBEDO, SEASONAL VARIATIONS, TEMPERATURE EFFECTS, UNITED STATES—ALASKA.

PBC18, UNITED STATES—ALASMA.

Two experimental oil spills of 7570 liters each were conducted at a black-spruce-forested site in February and July of 1976.

The long-term effects of the spills on the active layer were directly related to the method of oil movement. The winter spill moved beneath the snow, within the surface moss layer, and the summer spill moved primarily below the moss, in the organic soil. The summer spill affected an area nearly one and one-half times that of the winter spill. Only 10% of the 303 sq m summer spill area had oil visible on the surface, while 40% of the 188 sq m winter spill had visible oil. Thew depths in the summer spill area increased from 1971 to 1980—average thaw depth was 72 cm vs. 48 cm in the control—and remained essentially the same in 1981 and 1982. Thew depths in the winter spill area consistently higher than under the blackened surface. Presumably the change in albedo due to the surface oil accounts for the increased thaw in the winter spill area. spill area

MP 1457

MP 1657
FIELD TESTS OF A FROST-HEAVE MODEL.
Guymon, G.L., et al, International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983.
Proceedings, Washington, D.C., National Academy
Press, 1983, p.409-414, 9 refs.
Berg, R.L., Hromadka, T.V., II.
38-175

38-1175
PROST HEAVE, FROST PENETRATION,
FREEZE THAW CYCLES, SOIL CREEP, SOIL
TEMPERATURE, GROUND WATER, WATER
PRESSURE, WATER LEVEL, MATHEMATICAL MODELS, ICE LENSES, ICE MELTING.

MODELS, ICE LENSES, ICE MELTING.

A one-dimensional mathematical model of frost heave based upon a nodal domain integration analog is compared to data collected from a Winchendon, Mass, field site. Air and soil temperatures, pore water pressures, and groundwater level data were collected on test sections containing aix different soils during the winters of 1978-1979 and 1979-1980. The soil samples were evaluated in the laboratory to determine soil moisture characteristics, hydraulic conductivity as a function of pore water tensions, density, and other parameters. The parameters were used together with assumed thermal parameters in a one-dimensional model that calculates the distributions of temperature and moisture content as well as the amount of ice segregation (vertically lumped frost heave) and thaw consolidation. Using measured air and soil surface temperatures as input data, the simulated frost heave and thaw consolidation agreed well with measured and soil surface temperatures as input data, the simulated frost beave and thaw consolidation agreed well with measured ground surface displacements that resulted from ice segregation or ice lens melting.

MP 1658 RELATIONSHIPS BETWEEN ESTIMATED MEAN ANNUAL AIR AND PERMAFROST TEM-PERATURES IN NORTH-CENTRAL ALASKA.

Haugen, R.K., et al, International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.462-467, 13 refs.
Outcalt, S.I., Harle, J.C.

38-1184

38-1184
PERMAFROST THERMAL PROPERTIES, AIR
TEMPERATURE, FROZEN GROUND TEMPERATURE, PERMAFROST DISTRIBUTION, SOIL
TEMPERATURE, UNITED STATES—ALASKA.

TEMPERATURE, UNITED STATES—ALASKA.

Mean annual air temperatures (MAAT) are estimated for
transact from central to northern Alaska. The estimated
MAAT are compared to mean annual ground temperatures
(MAGT) representative of upper permafrost temperatures.
The estimation of MAAT for the remote and topographically
complex transact area was based on trend surface estimates
of numerous short-term (1-7 years) temperature records for
numerous short-term (1-7 years) temperature records from
and longer records from existing National Weather Service
stations. The standard error of the estimated MAAT
falls within a degree (C) of observed MAAT for stations
with long-term records. The MAGT are based on subsurface
thermistor measurements made at construction sites and are
therefore from disturbed terrain, but data were selected to
minimize the effects of disturbance.

MAGT measurements
ranged from -1.5 C, in the north to -0.7 C near Fairbanks.

Predicted MAAT ranged from -11.5 C at Prudhoe Bay
to -4.5 C in the Pairbanks area.

MP 1659
COMPARISON OF TWO-DIMENSIONAL DO-MAIN AND BOUNDARY INTEGRAL GEO-THERMAL MODELS WITH EMBANKMENT FREEZE-THAW FIELD DATA.

Hromadka, T.V., II, et al, International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings. Washington, D.C., National Academy Press, 1983, p. 509-513. Guymon, G.L., Berg, R.L.

38-1192 36-197
EMBANKMENTS, FREEZE THAW CYCLES,
THERMAL PROPERTIES, THAW DEPTH,
FROST PENETRATION, PAVEMENTS, RUNWAYS, MATHEMATICAL MODELS, TEMPERATURE VARIATIONS, COMPUTERIZED SIMU-LATION.

The time- and position-dependent locations of the 0 C isotherm were calculated using two modelling strategies: a domain

method and a boundary integral method. Simulations were made for the runway embankment at Deadhone Airport near Prudhoe Bay, Alaska. The same thermal properties, initial conditions, and boundary conditions were used in both models. Sinusoidal surface temperature variations, dependent upon surface type and exposure, were used in the simulations rather than measured surface temperatures. The positions of the 0 C isotherm determined by the boundary integral method near the time of maximum thaw penetration were essentially the same as those determined by the finite element method, and results from both models agreed closely, within a few centimeters over a total freezing depth of about 2.5 m, with the measured positions. The largest differences between measured and computed positions occurred early in the freezing and thawing seasons. The primary advantage of using the boundary integral method for problems specifically of the type considered herein is that it requires only a few modal points, so computer simulations can be completed rapidly on a micro computer. If the two-dimensional thermal regime is necessary, the finite element method is most suitable. method is most suitable

MP 1660 RECOVERY AND ACTIVE LAYER CHANGES FOLLOWING A TUNDRA FIRE IN NORTH-WESTERN ALASKA.

THE REPORT OF THE PROPERTY OF

38-1108

TUNDRA, FIRES, REVEGETATION, PERMA-FROST, ACTIVE LAYER, THAW DEPTH, GROUND ICE, HUMMOCKS, SOIL TEMPERA-TURE.

TURE.

An upland tundra fire, started by lightning, burned 48 sq km near the Kokolik River in northwestern Alaska during late July and early August 1977. Permanent plots were established to monitor recovery of severely, moderately, and tightly burned areas as well as unburned tundra. During the following 5 years the original permanent plots and other portions of the burn were observed annually. Vegetative recovery was most rapid and active layer effects were least on a high-centered polygonal area and on severely burned tussock tundra. By August 1979 the sedge-shrub vegetation had largely recovered while both the polygonal ground and the tussock tundra were still readily recognizable as burned areas. Accelerated hydraulic and thermal erosion had occurred on some slopes, resulting in exposures of massive bodies of ground ice. Active layer thicknesses averaged 27 cm in the unburned areas and 35 cm within severely burned areas in August 1977 and reached a maximum at all but one site in August 1979. Depth of thaw decreased between 1979 and 1982 in the sedge-shrub tundra and in the lightly burned shrub tundra and remained at the same increased level through 1982 at all other sites.

MP 1661

MP 1661 GROUND ICE IN PERENNIALLY PROZEN SEDIMENTS, NORTHERN ALASKA.

Lawson, D.E., International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.695-700, 23 refs.
38-1225

GROUND ICE, PERMAFROST HYDROLOGY, PERMAFROST THERMAL PROPERTIES, SEDI-MENTS, ICE VOLUME, GROUND THAWING, GRAIN SIZE, LANDFORMS, FREEZE THAW CYCLES, AERIAL SURVEYS.

CYCLES, AERIAL SURVEYS.

The distribution and volume of ice in perennially frozen sediments beneath three unglaciated sites in northern Alaska vary with the grain size and depositional origins of the sediment, thermal history (permafrost aggradation and degradation), and age of the terrain and deposits. Substantial lateral variation in near-surface ice volume exists between and within each site, but reasonably consistent trends in ice content with depth were measured beneath individual landforms. Primary deposits, those deposited and frozen without postdepositional thermal or sedimentologic modification, contain the highest volume of ice at each locality. Sediments that have undergone thawing or resedimentation typically contain much less access ice. Thaw lake, slope, or fluvial processes modify ice contents and produce sedimenor fluvial processes modify ice contents and produce sedimen-tary sequences with a spatial distribution of ice determined by these depositional processes and the subsequent thermal history.

MP 1662

MP 1662
THAWING BENEATH INSULATED STRUCTURES ON PERMAPROST.
Lunardini, V.J., International Conference on Permafrost, 4th, Fairbanka, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.750-755, 20 refs.
38-1235

PERMAFROST BENEATH STRUCTURES, GROUND THAWING, THERMAL INSULA-TION, HEAT TRANSFER, PHASE TRANSFOR-MATIONS, DESIGN, ANALYSIS (MATHEMAT-ICS).

The problem of thawing beneath heated structures on perma-frost (or cooled structures in nonpermafrost zones) must

be addressed if safe engineering designs are to be conceived. In general there are no exact solutions to the problem of conduction heat transfer with phase change for practical geometries. The quasi-steady approximation is used to solve the phase-change problem for insulated geometries, including infinite strips, rectangular buildings, and circular storage tanks. Analytical solutions are presented and graphed for a range of parameters with practical importance.

INVESTIGATION OF TRANSIENT PROCESSES IN AN ADVANCING ZONE OF FREEZING. McGaw, R., et al, International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.821-825, 9 refs. Berg, R.L., Ingersoil, J.W. 38-1248

38-1245
SOIL FREEZING, GROUND WATER, WATER
PRESSURE, UNFROZEN WATER CONTENT,
ICE LENSES, TEMPERATURE EFFECTS, TENSILE PROPERTIES, LIQUID PHASES, WATER TABLE, TESTS.

TABLE, TESTS.
Studies have indicated a relation between subfreezing temperature in a fine-grained soil and pressure (moisture tension) in the film water adjacent to an ice lens. During the experiments reported here, concurrent measurements were obtained of temperature and pressure in the liquid water phase of a freezing silt soil. Preezing was from the top down utilizing an open system, with the water table held at the base of a specimen 30 cm long. The freezing front advanced into the specimen at a generally decreasing rate from 20 mm/day to 5 mm/day. The tests utilized a special tensioneter developed at CRREL that continues to measure moisture tension below a temperature of 0 C as long as continuity with the unfrozen water is maintained. Moisture tensions were registered continuously up to 75 kPa (0.75 atm), after which the tension remained constant or decreased slightly.

SOIL-WATER DIFFUSIVITY OF UNSATURATED FROZEN SOILS AT SUBZERO TEMPERA-

Nakano, Y., et al, International Conference on Perma-frost, 4th, Pairbanks, Alaska, July 17-22, 1983. Pro-ceedings, Washington, D.C., National Academy Press, 1983, p.889-893, 26 refs. Tice, A.R., Oliphant, J.L., Jenkins, T.F. 38-1260

UNFROZEN WATER CONTENT, SOIL WATER, DIFFUSION, WATER TRANSPORT, TEMPERATURE EFFECTS, WATER CONTENT, GROUND

ICE.

The soil-water diffusivities of soils containing no ice were determined at -1 C by an experimental method recently introduced. The theoretical basis of the method is presented. The measured diffusivities of three kinds of soils are found to have a common feature in that the diffusivity increases with increasing water content, attains a peak, and increases again as the water content increases. This common feature of the soils at the subzero temperature is discussed in comparison with unfrozen soils. The experimental data appear to indicate that the basic transport mechanism of water in soils containing no ice at the subzero temperature is essentially the same as that in unfrozen soils containing a small amount of water.

MP 1665
SEISMIC VELOCITIES AND SUBSEA PERMA-FROST IN THE BEAUPORT SEA, ALASKA.
Neave, K.G., et al, International Conference on Per-mafrost, 4th, Fairbanks, Alaska, July 17-22, 1983.
Proceedings, Washington, D.C., National Academy Press, 1983, p.894-898, 17 refs.
Sellmann, P.V.
38.1261

38-1261
SUBSBA PERMAFROST, PERMAFROST DISTRIBUTION, SEISMIC REFRACTION, GROUND ICE, PERMAFROST DEPTH, SEISMIC VELOCITY, BEAUFORT SEA.

TY, BEAUFORT SEA.

The distribution of high-velocity material was used as an indicator of ice-bonded permafrost. Observations from ice survey and marine seismic records, coupled with control from a small number of drill holes, suggest that ice-bonded permafrost is extremely widespread in the Beaufort Sea. Large areas of high-velocity material at shallow depths, 10-40 m below the seabed, were observed near Prudhoe and Harrison Baya. In some cases these zones extended up to 35 km from shore. It was also common to find that depths to the high-velocity material increased with distance from the shore. Observed depths were as great as 150-230 m below the seabed.

MP 1666 WATER MIGRATION DUE TO A TEMPERA-TURE GRADIENT IN FROZEN SOIL

Oliphant, J.L., et al., International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Preas, 1983, p.951-955, 10 refs. Tice, A.R., Nakano, Y.

38-1272

PERMAPROST HYDROLOGY, FROZEN GROUND PHYSICS, SOIL WATER MIGRATION UNPROZEN WATER CONTENT, BOUNDARY **FROZEN** TEMPERATURE GRADIENTS, EX-PERIMENTATION.

Closed soil columns at an initially uniform total water content were subjected to a nearly linear and constant temperature gradient along their length. At various times, the columns were sectioned and water content as a function of position was determined gravimetrically. Unfrozen water content was temperature curves were also determined with a nuclear magnetic resonance technique on separate samples of the aame soil at the same dry density. It was found that the water migrated from the warm to the cold end and two zones developed in each of the tubes, one that contained only liquid water and the other containing ice and water. The boundary between the two zones also migrated toward the cold end as the experiment progressed, and the water content of the zone containing only water fell while that of the zone containing ice and water increased. were subjected to a nearly linear and constant temperature gradient along their length. At various times, the columns

ATMOSPHERIC BOUNDARY-LAYER MODIFI-CATION, DRAG COEFFICIENT, AND SURFACE HEAT FLUX IN THE ANTARCTIC MARGINAL ICE ZONE.

Andreas, E.L., et al, Journal of geophysical research, Jan. 20, 1984, 89(C1), p.649-661, 71 refs. Tucker, W.B., Ackley, S.F. 38-1819

BOUNDARY LAYER, METEOROLOGICAL IN-STRUMENTS, HEAT FLUX, ICE EDGE, RADI-OSONDES

OSONDES.

During a traverse of the Antarctic marginal ice zone (MIZ) near the Greenwich Meridian in October 1981, we launched a series of radiosondes along a 150-km track starting at the ice edge. Since the the wind was from the north, off the ocean, these radiosonde profiles showed profound modification of the atmospheric boundary layer (ABL), as the increasing surface roughness decelerated the flow. The primary manifestation of this modification was a lifting of the inversion layer with increasing distance from the ice edge by the induced vertical velocity. But there was also a cooling of the stably stratified mixed layer below the inversion and a consequent flux of sensible heat to the surface that averaged over 200 W/sq m. The magnitude of this flux suggests that atmospheric heat transport plays a significant role in the destruction of ice in the Antarctic MIZ. Using the rising of the inversion and ABL similarity theory, we estimated the neutral stability drag coefficient across the MIZ increased from its open ocean value, 0012, at the ice edge to 0.04 at 80-90% ice concentration. We present an equation for this dependence of drag on ice concentration that should be useful for modeling the surface stress in marginal ice zones. (Auth.)

MP 1668 ANTARCTIC SEA ICE MICROWAVE SIGNA-TURES AND THEIR CORRELATION WITH IN SITU ICE OBSERVATIONS.

Comiso, J.C., et al, *Journal of geophysical research*, Jan. 20, 1984, 89(C1), p.662-672, 24 refs. Ackley, S.F., Gordon, A.L. 38-1820

ICE SEA ICE DISTRIBUTION, MICROWAVES, REMOTE SENSING, SPACEBORNE PHOTOGRAPHY, ANTARCTICA—WEDDELL SEA.

The general characteristics and microwave radiative properties of sea ice in the Weddell Sea region during the onset of spring are studied by using the NIMBUS 7 Scanning Multichannel Microwave Radiometer (SMMR) and other satellite sensors in conjunction with in situ observations. The position of the ice edge, the gradient of ice concentration, and the width of the Marginal Ice Zone are inferred from the microwave width of the Marginal loe Zone are inferred from the microwave data and are found to be consistent with ship observations especially at 18 GHz. The sensitivities of the various SMMR frequencies to surface and other effects are investigated by using multi-spectral cluster analysis. The results show considerable variability in emissivity, especially at 37 GHz, likely associated with varying degrees of surface wetness. Ice concentrations are derived by using two methods: one that assumes fixed emissivities for consolidated ice and an iterative procedure that accounts for the variable emissivities to be variable gives ice concentrations that are more consistent with qualitative field observations. (Auth.)

MP 1669 POSSIBILITY OF ANOMALOUS RELAXATION DUE TO THE CHARGED DISLOCATION PROC

Itagaki, K., Journal of physical chemistry, Oct. 13, 1983, 87(21), p.4261-4264, 12 refs.

ICE PHYSICS, ICE ELECTRICAL PROPERTIES, ICE RELAXATION, CHARGE TRANSFER, ELECTRIC CHARGE, DIELECTRIC PROPER-TIES, SPECTRA.

The possible contribution of electrically charged dislocations to dielectric relaxation and the consequent effects were examined and compared with experimental results. A catastrophe caused by the positive feedback was found to be possible under normally attainable conditions.

MP 1670

EFFECT OF X-RAY IRRADIATION ON INTER-NAL FRICTION AND DIELECTRIC RELAXA-TION OF ICE.

Itagaki, K., et al, Journal of physical chemistry, Oct. 13, 1983, 87(21), p.4314-4317, 5 refs. Ackley, S.F., VanDevender, J.P. 38-1623

ICE PHYSICS, ICE ELECTRICAL PROPERTIES, ICE RELAXATION, INTERNAL FRICTION, X RAY DIFFRACTION, DIELECTRIC PROPERTIES, RADIATION.

Studies of X-ray irradiation effects on dielectric relaxation and internal friction of ice indicated that relaxation times were shortened in both cases, but the corresponding quantities (the imaginary part of the dielectric constant and loss tangent in internal friction) behave differently. Of the two mechanisms discussed in an attempt to explain the results, a charged dislocation process seems to provide the better fit.

MP 1671 EFFECT OF STRESS APPLICATION RATE ON THE CREEP BEHAVIOR OF POLYCRYSTAL-LINE ICE.

Cole, D.M., Journal of energy resources technology, Dec. 1983, 105(4), p.454-459, 14 refs. 38-2084

(FORCES), TEMPERATURE EFFECTS, ICE ACOUSTICS, RHEOLOGY, TESTS.

ACOUSTICS, RHEOLOGY, TESTS.

This work examines the effect of the rate of stress application on the creep behavior of polycrystalline ice. Stress rates from 1/1000 to 1.84 MPa/s were used to achieve a creep stress of 3.6 MPa at test temperatures of -5 and -10°C. The treatment emphasizes the effect of stress application rate on primary behavior and the accompanying microfracturing activity. Acoustic emission measurements taken in all tests indicate the onset and rate peak of the microfracturing activity. The stress application rate has little effect on the minimum strain rate, the strain at which it occurs, or the characteristics of tertiary creep provided that the loading ramp ends prior to reaching the nominal failure strain of 1.0 percent. Primary creep behavior is significantly affected only at rates below about 1/100 MPa/s. Results indicate that when the loading ramp continues through the failure strain, no minimum strain rate occurs, but rather the strain rate increases monotonically throughout the entire test.

MP 1672

IMPLICATIONS OF SURFACE ENERGY IN ICE ADHESION.

Itagaki, K., Journal of adhesion, 1983, 16(1), p.41-48,

ICE ADHESION, ICE SOLID INTERFACE, SUR-FACE PROPERTIES, ICE STRENGTH, STRESSES, COATINGS.

MP 1673

MARGINAL ICE ZONES: A DESCRIPTION OF AIR-ICE-OCEAN INTERACTIVE PROCESSES, MODELS AND PLANNED EXPERIMENTS.

Johannessen, O.M., et al, Arctic technology and poli-cy. Edited by I. Dyer and C. Chryssostomidis, Wash-ington, D.C., Hemisphere Publishing Co., 1984, p. 133-146, Refs. p. 139-140. Hibler, W.D., III, Wadhams, P., Campbell, W.J., Has-

selmann, K., Dyer, I.

J8-1994 ICE CONDITIONS, ICE EDGE, ICE WATER IN-TERFACE, ICE AIR INTERFACE, ICE NAVIGA-TION, ICE MECHANICS, OCEANOGRAPHY, METEOROLOGY, AIR WATER INTERAC-TIONS, CLIMATE, ICE ACOUSTICS.

TIONS, CLIMATE, ICE ACOUSTICS.

The marginal ice zones (MIZ) are regions where temperate and polar climate systems interact, resulting in strong horizontal and vertical gradients in the atmosphere and the occan. These gradients lead to mesoscale processes which affect the heat, salt, and momentum fluxes at the ice margin. It is therefore important to increase our understanding of these processes in order to model the air-ice-occan system in the MIZ, and to build up a predictive capability of the ice margin. Parameterization of these processes is also necessary in large scale modeling of the sea ice influence

on the global climate system. This paper reviews our knowledge of physical processes occurring in the marginal ice zones, points out problem areas and describes Marginal ice Zone Program (MIZEX) to be initiated in 1983.

MP 1674

MECHANICAL PROPERTIES OF ICE IN THE

ARCTIC SEAS.
Weeks, W.F., et al, Arctic technology and policy.
Edited by I. Dyer and C. Chryssostomidis, Washington, D.C., Hemisphere Publishing Co., 1984, p.235259, 109 refs.

Mellor, M. 38-1999

38-1999
ICE MECHANICS, SEA ICE, ICE LOADS, ICE-BERGS, ICE ISLANDS, ICE STRENGTH, STRESS STRAIN DIAGRAMS, ICE STRUCTURE, ICE COMPOSITION, SCANNING ELECTRON MICROSCOPY, ARCTIC OCEAN.

The mechanical properties are reviewed for the main types of ice in arctic seas glacial (icebergs), shelf (ice islands), sea ice; and representative values are given. Each ice type possesses a characteristic range of structures and compositions that differentiate it from other varieties of ice and to a considerable extent, these produce large variations in mechanical properties.

Factors affecting mechanical properties (temperature, brine and gas volume, crystal orientation and size, strain rate) are discussed, as are gaps, contradictions, and inadequacies in available data.

PROCEEDINGS

International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisiana, Feb. 12-17, 1984, New York, NY, American Society of Mechanical Engineers, 1984, 3 vols., Refs. passim. For selected papers see from Vol.1: 38-2979; from Vol.2: 38-2980; from Vol.3: 38-2017 through 38-2068. Lunardini, V.J., ed. 38-2016

PERMAFROST PHYSICS, FROZEN GROUND PHYSICS, SEA ICE, FROST HEAVE, ICE CONDITIONS, OFFSHORE STRUCTURES, ICE SOLID INTERFACE, HEAT TRANSFER, ENGINEERING, STEEL STRUCTURES.

MP 1676

DETERIORATION OF FLOATING ICE COV-ERS.

Ashton, G.D., International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisiana, Feb. 12-17, 1984. Proceedings, Vol.3. Edited by V.J. Lunardini, New York, Allerican Society of Mechanical Engineers, 1984, p.26-33, 18 refs. 38-2020

TRANSFER, ICE MELTING, ICE COVER STRENGTH, SOLAR RADIATION, ALBEDO, THERMAL REGIME.

THERMAL REGIME.

The deterioration of floating ice covers is analyzed to determine under what conditions the ice cover loses strength due to internal melting. The analysis considers the interaction between sensible heat transfer and long wave radiation loss at the surface, the surface albedo, the short wave radiation penetration and absorption and the unsteady heat conduction within the ice. The thermal analysis then leads to a determination of the porosity of the ice that allows strength analysis to be made using beam-type analyses. The results provide criteria to determine when and how rapidly the ice cover loses strength and under what conditions it will regain the original strength associated with an ice cover of full integrity.

PERFORMANCE OF A THERMOSYPHON WITH AN INCLINED EVAPORATOR AND VER-TICAL CONDENSER.

ZATING, J.P., et al, International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisiana, Feb. 12-17, 1984. Proceedings, Vol.3. Edited by V.J. Lunardini, New York, American Society of Mechanical Engineers, 1984, p.64-68, 15 refs.

Haynes, F.D.

38-2026 COOLING, SOIL STABILIZATION, PIPELINE SUPPORTS, EQUIPMENT, THERMOSYPHONS, AIR TEMPERATURE, WIND VELOCITY.

AIR TEMPERATURE, WIND VELOCITY.
Thermosyphons are presently being installed at inclined angles for various subgrade cooling applications in the Arctic. However, the thermal performance characteristics of a thermosyphon installed at these inclined angles is unknown. The performance of a standard CO2 filled, two phase thermosyphon was determined experimentally. Heat removal effectivenesses were measured over a wide range of inclined angles from the horizontal. Empirical expressions were obtained for the heat removal rates as a function of wind speed and ambient air temperature.

MP 1678 TWO-DIMENSIONAL MODEL OF COUPLED HEAT AND MOISTURE TRANSPORT IN FROST HEAVING SOILS.

Guymon, G.L., et al, International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisians, Feb. 12-17, 1984. Proceedings, Vol.3. Edited by V.J. Lunardini, New York, American Society of Mechanical Engineers, 1984, p.91-98,

Hromadka, T.V., II, Berg, R.L.

38-2030
FROST HEAVE, FROZEN GROUND PHYSICS,
HEAT TRANSFER, GROUND ICE, MOISTURE
TRANSFER, SOIL WATER MIGRATION,
MATHEMATICAL MODELS, FREEZE THAW
CYCLES, EMBANKMENTS, WATER PRESSURE,
TRANSFER AT THE DEFECTS. TEMPERATURE EFFECTS

TEMPERATURE EFFECTS.

A two-dimensional model of coupled beat and moisture flow in frost-heaving soils is developed based upon well known equations of heat and moisture flow in soils. Numerical solution is by the nodal domain integration method which includes the integrated finite difference and the Galerkin finite element methods. Solution of the phase change process is approximated by an isothermal approach and phenomenological equations are assumed for processes occurring in freezing or thawing zones. The model has been verified against experimental one-dimensional freezing soil column data and experimental two-dimensional soil thawing lank data as well as two-dimensional soil acepage data. The model has been applied to several simple but useful field problems such as roadway embankment freezing and frost heaving.

MP 1679 SUMMARY OF THE STRENGTH AND MODU-LUS OF ICE SAMPLES FROM MULTI-YEAR PRESSURE RIDGES.

Cox, G.F.N., et al, International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisians, Feb. 12-17, 1984. Proceedings, Vol.3. Edited by V.J. Lunardini, New York, American Society of Mechanical Engineers, 1984, p.126-

Richter, J.A., Weeks, W.F., Mellor, M. 38-2035

PRESSURE RIDGES, ICE STRENGTH, COM-PRESSIVE PROPERTIES, TEMPERATURE EF-FECTS, STRAIN TESTS, ICE SAMPLING, MEA-SURING INSTRUMENTS, POROSITY, BEAU-FORT SEA.

PUKI SEA.

Over two hundred unconfined compression tests were performed on vertical ice samples obtained from ten multiyear pressure ridges in the Beaufort Sea. The tests were
performed on a closed-loop electrohydraulic testing machine
at two strain rates (1/100,000 and 1/1000/s) and two temperatures (-20 and -5C). This paper summarizes the sample
preparation and testing techniques used in the investigation
and presents data on the compressive strength and initial
tangent modulus of the ice.

VARIATION OF ICE STRENGTH WITHIN AND BETWEEN MULTIYEAR PRESSURE RIDGES IN THE BEAUFORT SEA.

Weeks, W.F., International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisiana, Feb. 12-17, 1984. Proceedings, Vol.3. Edited by V.J. Lunardini, New York, American Society of Mechanical Engineers, 1984, p.134-139, 6 refs. 38-2036

ICE STRENGTH, PRESSURE RIDGES, COM-PRESSIVE PROPERTIES, ICE STRUCTURE, ICE COVER STRENGTH, STRAINS, TEMPERATURE EFFECTS, POROSITY, SEA ICE, BEAUFORT

SEA.

A recent series of tests on the uniaxial compressive strength of ice samples taken from multiyear pressure ridges allows the testing of several hypotheses concerning the variation in strength within and between ridges. The data set consists of 218 strength tests performed at two temperatures (5 and -20C) and two strain rates (1/1000 and 1/100,000/s). There was no significant difference between the strength of the ice from the ridge sails and the ice from the ridge keels when tested under identical conditions. As the total porosity of the ice from the sails is higher by 40% than the ice from the keels, the lack of a significant difference is believed to result from the large variations in the structure of the ice which occur randomly throughout the cores. A three-level analysis of variance model was used to study the variations in strength between 10 different ridges, between cores located side by side in a given ridge, and between samples from the same core. In all cases the main factor contributing to the observed variance was the difference within cores. This is not surprising considering the rather extreme local variability in the structure of ice in such ridges. There was no reason at the 5% level of significance to doubt the hypothesis that the different cores at the same site and the different ridges have equal strength means.

MP 1661
RELATIONSHIP BETWEEN CREEP AND
STRENGTH BEHAVIOR OF ICE AT FAILURE. AND Cole, D.M., Cold regions science and technology, Oct. 1983, 8(2), p.189-197, 4 refs.

38-1513

ICE STRENGTH, ICE CREEP, ICE MECHANICS, STRESSES, STRAINS.

STRESSES, STRAINS.

This work explores the correspondence between the results of creep and strength tests performed on isotropic polycrystaline ice. A unique experimental procedure, termed a two-mode test in the present work, allows the testing of a single specimen under conditions of constant deformation rate up to failure and constant load thereafter. Using this procedure, the prevailing values of stress, strain and strain rate can be compared at the failure point under the two test modes without the influence of specimen variation. The effect of the stress path prior to failure on the creep behavior after failure can also be investigated. Results indicate coincidence of the failure points from creep and strength tests in stress/strain-rate/strain space. Furthermore, it appears that within the range of variables tested, the creep behavior after the mode switch at failure is independent of the stress path experienced before failure. (Auth.)

MP 1682
COMPARISON OF U.S.S.R. CODES AND U.S. ARMY MANUAL FOR DESIGN OF FOUNDATIONS ON PERMAPROST.

TONS ON PERMAPROST.

TO A March Cold regions science and technology, Aug.

Fish, A.M., Cold regions science and technology, Aug. 1983, 8(1), p.3-24, 27 refs.

38-1495 PERMAFROST PERMAFROST BENEATH STRUCTURES, FOUNDATIONS, BUILDING CODES, SOIL CLASSIFICATION, SETTLEMENT (STRUCTUR-AL), SOIL CREEP, SAFETY.

AL), SUIL CREEF, SAFELY.

A comparative study was made of design criteria and analytical methods for footings and pile foundations on permafrost employed in U.S.S.R. Design Code SNiP II-8-76 (1977) and U.S. Army CRREL SR 80-34 developed in the early 1970s by the U.S. Army Corps of Engineers and published in 1980. The absence of adequate constitutive equations for frozen soils and of rigorous solutions of the boundary problems has made it necessary to incorporate (explicitly for inczen sous and or ingrous solutions of the boundary problems has made it necessary to incorporate (explicitly or implicitly) various safety factors in the foundation analyses. From the review it is concluded that the principal difference between these practices is in the assessment and application of appropriate values of safety factors, which leads to a substantial discrepancy in the dimensions and costs of footings and pile foundations in permafrost. (Auth.)

STRAIN MEASUREMENTS ON DUMBBELL SPECIMENS.

Mellor, M., Cold regions science and technology, Aug. 1983, 8(1), p.75-77, 3 refs. 38-1501

STRAIN TESTS, TENSILE PROPERTIES.

MP 1684 LAKE ICE DECAY.

Ashton, G.D., Cold regions science and technology, Aug. 1983, 8(1), p.83-86, 4 refs. 38-1503

LAKE ICE, ICE COVER THICKNESS, ICE MELT-

MP 1685

PRELIMINARY EXAMINATION OF THE EFFECT OF STRUCTURE ON THE COMPRESSIVE STRENGTH OF ICE SAMPLES FROM MULTI-YEAR PRESSURE RIDGES.

Richter, J.A., et al. International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisians, Feb. 12-17, 1984. Proceedings, Vol.3. Edited by V.J. Lunardini, New York, American Society of Mechanical Engineers, 1984, p.140-144 144, 9 refs

Cox, G.F.N. 38-2037

ICE STRENGTH, PRESSURE RIDGES, COM-PRESSIVE PROPERTIES, STRAIN TESTS, ICE STRUCTURE, TEMPERATURE EFFECTS, SEA ICE, LOADS (FORCES), POROSITY.

ICE, LOADS (FORCES), POROSITY.

A series of 222 uniaxial constant-strain-rate compression tests were performed on vertical multi-year pressure ridge sea ice samples. A preliminary analysis of the effect of structure on the compressive strength of the ice was performed on 78 of these tests.

Test parameters included a temperature of -5C (23F) and strain rates of 1/100,000 and 1/1000/s. Columnar ice loaded parallel to the elongated crystal axes and perpendicular to the crystal c-axis was consistently the strongest type of ice. The strength of the columnar samples decreased significantly as the orientation of the elongated crystals approached the plane of maximum shear. Samples containing granular ice or a mixture of granular and columnar ice resulted in intermediate and low strength values. No clear relationship could be established between structure and strength for these ice types. However, in general, their strength decreased with an increase in porosity.

MP 1686 INPLUENCE OF GRAIN SIZE ON THE DUC-TILITY OF ICE.

Cole, D.M., International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisiana, Feb. 12-17, 1984. Proceedings, Vol.3. Edited by V.J. Lunardini, New York, American Society of Mechanical Engineers, 1984, p.150-157, 21 refs. 38-2039

ICE CRACKS, ICE CREEP, ICE STRENGTH, GRAIN SIZE, POROSITY, COMPRESSIVE PROP-ERTIES, ICE CRYSTAL STRUCTURE, LOADS

(FORCES), BRITTLENESS, TESTS.

(FORCES), BRITTLENESS, TESTS.

This paper presents observations made regarding the influence of grain size on the extent of internal cracking and creep behavior of polycrystalline ice. The test material was initially isotropic, laboratory prepared polycrystalline ice. Grain size ranged from 1.52 to 5.65 mm. Specimens were tested under constant load in uniaxial compression with an initial stress of 2MPa and at a temperature of -5C. Optical post-test analysis showed that the estimated crack density varied over nearly three orders of magnitude as the grain size increased by a factor of three. The smallest-grained specimen exhibited no visible fractures. The strain at the minimum creep rate decreased significantly as the grain size, and hence the fracturing activity increased. These observations indicate that under the prevailing test conditions, the stated variations in grain size alone can initiate the ductile-to-brittle transition. Discussion centers on a micro-mechanical explanation of the test results as well as the implications of the findings to areas of practical concern.

MP 1687 EXPERIMENTAL DETERMINATION OF BUCKLING LOADS OF CRACKED ICE SHEETS. Sodhi, D.S., et al, International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisiana, Feb. 12-17, 1984. Proceedings, Vol.3. Edited by V.J. Lunardini, New York, American Society of Mechanical Engineers, 1984, p.183-186, 13 refr

Adley, M.D. 38-2044

FLOATING ICE, ICE CRACKS, ICE SHEETS, LOADS (FORCES), ICE SOLID INTERFACE, ICE LOADS, ICE DEFORMATION, EXPERIMENTA-

An experimental study was undertaken to determine the buckling loads of cracked, floating ice sheets. The configurations of the cracks considered in this study were symmetrical and unsymmetrical with respect to the structure and the direction of loading. The results of this study are compared with those of a theoretical study using a finite element method. The comparison between the two results is good although there is some scatter in the experimental data.

MP 1688

MP 1088
SNOW PARTICLE MORPHOLOGY IN THE SEASONAL SNOW COVER.
Colbeck, S.C., American Meteorological Society.
Bulletin, June 1983, 64(6), p.602-609, 14 refs.

38-2095 SNOWFLAKES, SNOW MORPHOLOGY, SNOW CRYSTAL STRUCTURE, SNOW WATER CON-TENT, SNOW COVER, FREEZE THAW CYCLES, PARTICLES, DEPTH HOAR, METEOROLOGI-

CAL FACTORS.

Snow precipitation degenerates rapidly once it reaches the ground. A wide variety of particle types develop in seasonal snow covers, thus leading to a wide range of snow properties. The most common varieties of particles are shown here. The physical processes responsible for the growth and development of these particles are described in general terms, althouth these processes are not understood as well as the processes of crystal growth in the atmosphere. The heat and mass flows associated with the development of these crystals in the snow cover are complicated because of snow's complex geometry.

MP 1689 USE OF RADIO FREQUENCY SENSOR FOR SNOW/SOIL MOISTURE WATER CONTENT MEASUREMENT.

McKim, H.L., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Aug. 1983, SR 83-31, Snow symposium, 3rd, Hanover, NH, Aug. 9-10, 1983. Proceedings, Vol.1, p.33-42, ADB-079 265, 16 refs.

979 203, 16 fets.
98-2122
SNOW WATER CONTENT, SOIL WATER,
SNOW BLECTRICAL PROPERTIES, SOIL PHYSICS, UNFROZEN WATER CONTENT, MEASURING INSTRUMENTS, DIELECTRIC PROP-ERTIES, TESTS, TEMPERATURE EFFECTS.

A solid-state, durable, inexpensive radio frequency sensor (RFS) has been developed and laboratory-tested. The RFS uses a Wien bridge circuit to measure a change in soil impedance when changes in soil moisture occur. Both electrical conductance and capacitance are measured at differing moisture contents. The dielectric constant of the soil

moisture is proportional to the measured capacitance and is approximately linear with respect to percent moisture. Due to the simple readout system, the RFS has the potential to be interfaced to a data collection system for data acquisition from remote areas. Preliminary tests on the temperature effect of the RFS accuracy have shown that volumetric water content can be obtained by the RFS over a wide range of temperatures. In addition to the soil moisture measurement, preliminary tests on the measurement of the liquid water-content of snow have been made. Comparison of the results with the calorimetric method indicate that the RF sensor can be used to measure snow water content. Since the RFS is soild state, it can be placed in remote areas and can monitor volumetric soil water content to within 0.5% by volume.

COMPARATIVE NEAR-MILLIMETER WAVE PROPAGATION PROPERTIES OF SNOW OR RAIN.

RAIN.

Nemarich, J., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Aug. 1983, SR 83-31, Snow symposium, 3rd, Hanover, NH, Aug. 9-10, 1983. Proceedings, Vol.1, p.115-129, ADB-079 265, 8 refs.

Wellman, R.J., Gordon, B.E., Hutchins, D.R., McDaniel, J., Lacombe, J., Olsen, R.O. 38-2129

38-2129

38-2129
SNOW PHYSICS, SNOW ACOUSTICS, SNOW-FALL, WAVE PROPAGATION, ATTENUATION, BACKSCATTERING, RAIN, SNOW WATER CONTENT, ELECTROMAGNETIC PROPERTIES, SNOWFLAKES, FALLING BODIES, MOD-

ELS.

Measurements are reported of attenuation and backscatter for rain and falling anow at near-millimeter wave frequencies of 96, 140, and 225 GHz. Comparisons are made between levels and frequency dependences of the attenuations for rain and anow. Backscatter coefficients as a function of time for several rain and snow events are presented. The relationship of the attenuation data obtained to calculations for spherical and spheroidal particles is discussed. It is shown that attenuation values calculated for an empirical distribution of ice spheres agree with measured values over a wavelength range from visible to 3.1 mm.

HYDROLOGIC FORECASTING USING LAND-SAT DATA.

Merry, C.J., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Aug. 1983, SR 83-31, Snow symposium, 3rd, Hanover, NH, Aug. 9-10, 1983. Proceedings, Vol.1, p.159-168, ADB-079 265, 12 refs.

Pangburn, T., McKim, H.L.

38-2132

SNOW WATER EQUIVALENT, REMOTE SENS-ING, HYDROLOGY, FORECASTING, LAND-SAT, SNOW DEPTH.

Messurements of anow depth and its water equivalent were obtained at 11 snow courses in the Allasash, Maine, area in conjunction with acquisition of five Landsat-2 and -3 images during the 1977-78 and 1978-79 winters. Digital imagery data acquired on 31 May 1978, when the land was snow-free, was used to classify land cover categories. Ground truth water equivalent measurements of snow were carea-weighted using the land cover classification to deriver earea-weighted using the land cover classification to deriver engional mean water equivalent values for snow cover on each of the five Landsat scenes. The 1 March 1978 snow measurement of 19.46 cm of water equivalent was used as an input value to the SSARR (Streamflow Synthesis and Reservoir Regulation) model. The SSARR prediction for the 1 March-31 May 1978 time period was within 78% of the spring melt recession period. However, the timing of six observed runoff peaks was off by 2 to 9 days. The magnitude of five of the predicted runoff peaks was within 75% of the recorded streamflow. Additional work on calibrating the basin peak timing and melt rate factors is underway.

UTILIZATION OF THE SNOW FIELD TEST SERIES RESULTS FOR DEVELOPMENT OF A SNOW OBSCURATION PRIMER.

Bornole, J.F., et al. U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Aug. 1983, SR 83-31, Snow symposium, 3rd, Hanover, N.H., Aug. 9-10, 1983. Proceedings, Vol.1, p.209-217, ADB-079 265, 21 refs.

Aitken, G.W. 38-2137

38-2137
SNOW OPTICS, ATTENUATION, SNOWFALL, BLOWING SNOW, SNOW DENSITY, ICE CRYSTAL STRUCTURE, WAVE PROPAGATION, VISIBILITY, MILITARY OPERATION, NAVIGATION, SNOWDRIFTS, METEOROLOGICAL FACTORS.

The attenuation of electro-optical (BO), infrared (IR), and millimeter wave (MMW) energy through the atmosphere in conditions of low visibility due to the presence of falling or blowing snow can present serious problems for the effective

use of surveillance and target acquisition systems. This paper discusses development of a snow obscuration primer for use by the Smoke and Aerosol Working Group (SAWG) of the Joint Technical Coordinating Group for Munitions Rifectiveness (JTCG/ME). A key part of this primer is incorporation of test results obtained in the SNOW-ONE, ONE-A, and -ONE-B field trials. This includes measurements of falling and blowing snow obscuration effects on BO/IR/MMW systems, both active and passive. An important aspect of this work, reported in this paper, is the evolution of a basis for developing "rules-of-thumb" for operation in air-borne-snow environments.

MP 1693 INCREASED HEAT FLOW DUE TO SNOW COMPACTION: THE SIMPLISTIC APPROACH COMPACTION: THE SIMPLISTIC APPROACH.
Colbeck, S.C., U.S. Army Cold Regions Research and
Engineering Laboratory. Special report, Aug. 1983,
SR 83-31, Snow symposium, 3rd, Hanover, NH, Aug.
9-10, 1983. Proceedings, Vol.1, p.227-229, ADB-079
265, Extended summary. 2 refs.
38-2138

SNOW COMPACTION, HEAT TRANSFER, SNOW HEAT FLUX, SNOW COVER STRUCTURE, SURFACE TEMPERATURE, MATH-EMATICAL MODELS.

When snow is compacted by foot or vehicle traffic, the compacted areas are visible on infrared images for some time. A simple model is used to calculate the temperature difference between the compacted and uncompacted anows. The results are given as temperature difference versus snow

MP 1694 USE OF LANDSAT DATA FOR PREDICTING SNOWMELT RUNOFF IN THE UPPER SAINT JOHN RIVER BASIN.

METTY, C.J., et al, International Symposium on Remote Sensing of Environment, 17th, Ann Arbor, MI, May 9-13, 1983. Proceedings, Ann Arbor, Envi-ronmental Research Institute of Michigan, 1983, p.519-533, 16 refs. Miller, M.S., Pangburn, T. 38-2166.

38-2166

38-2100
RUNOFF FORECASTING, SNOWMELT, REMOTE SENSING, SNOW WATER EQUIVA-LENT, SNOW DEPTH, LANDSAT, REFLECTIVI-TY, FOREST LAND, MODELS, VEGETATION FACTORS, UNITED STATES—MAINE—ST. FACTORS, U

JOHN RIVER.

To test a hypothesis that Landaat reflected radiance values on a regional scale do change, histograms of the Landast MSS band 7 reflected radiance values for a 300 x 300 pixel (420 sq km) area near Allagash, Maine, were evaluated to quantify the change. A statistical description (skewness and kurtosis) of the histogram for each scene was developed and then correlated with ground measurements of anow depth. A snow index based on skewness and modal population was found to correlate well with anow depth. Following these initial results, the Landaat data were reexamined and corrections were made for solar elevation and MSS sensor calibration. The reflected radiance from open arcas showed a consistent increase in intensity with increasing snow depth. The forested land cover classes did not change with snow depth. The ground truth measurements of water equivalent were area-weighted by the May land cover classesfication to derive mean regional water equivalent values for each of the five Landaat winter scenes. The 1 March 1978 estimate of 7.66 inches for mow water equivalent was used as input to the SSARR model for prediction of runoff during the 1 March through 31 May 1978 time period.

MP 1695

MP 1695 EXTRACTION OF TOPOGRAPHY FROM SIDE-LOOKING SATELLITE SYSTEMS—A C STUDY WITH SPOT SIMULATION DATA.

STUDY WITH SPOT SIMULATION DATA. Ungar, S.G., et al, International Symposium on Remote Sensing of Environment, 17th, Ann Arbor, MI, May 9-13, 1983. Proceedings, Ann Arbor, Environmental Research Institute of Michigan, 1983, p.535-530, 3 refs. Iriah, R., Merry, C.J., Strahler, A.H., McKim, H.L., Gauthier, B., Weill, G., Miller, M.S. 38-2167

TOPOGRAPHIC FEATURES, SIDE LOOKING RADAR, REMOTE SENSING, RADIOMETRY, COMPUTER APPLICATIONS, MAPPING.

COMPUTER APPLICATIONS, MAPPING.
A test site in the Cape Flattery area of northwest Washington state was selected for constructing a simulated data set to evaluate techniques for extracting topography from side-looking satellite systems. A negative transparency orthophotoqued was digitized at a spacing of 85 microa, resulting in an equivalent ground distance of 9.86 m between pixels and a radiometric resolution of 256 levels. A bilinear interpolation was performed on U.S. Geological Survey digital elevation model (DEM) data to generate elevation data a 9.86 m resolution. The nominal orbital characteristics and geometry of the SPOT (Système Probatoire d'Observation de la Terre) satellite were convoluted with the data files to produce simulated panchromatic HRV (Fligh Resolution Visibel) digital stereo imagery for three different orbital paths. Techniques were developed for reconstructing topographic data. Resentially, these techniques coalign a nadir and off-

nadir pass to calculate the stereo displacement for each pixel in the nadir view by correlating a small subares to a corresponding subares in the off-nadir pass. Preliminary analyses with the simulated HRV data and "test pattern" data verify the efficacy

LIME STABILIZATION AND LAND DISPOSAL OF COLD REGION WASTEWATER LAGOON SLUDGE.

Schneiter, R.W., et al, *Bavironment international*, 1982, 7(3), p.207-213, 30 refs.
Middlebrooks, B.J., Sletten, R.S.

38-2244

WASTE TREATMENT, WATER TREATMENT, LIMING, SLUDGES, RECLAMATION.

LIMING, SLUDGES, RECLAMATION.

Effects of lime (Ca(OH)2; stabilization upon the pathogenic population in accumulated solids associated with the operation of two acrated wastewater lagoons in Alaska and two facultative wastewater lagoons in northern Utah were evaluated. The subsequent drying, at a temperature of 12C, of the lime stabilized aludges on sand and soil beds was also investigated. The lime stabilization of the lagoon studges was evaluated by doeing the aludges with lime and applying aludges to bench scale drying beds. Lime addition produced high fecal coliform reduction, and the limed studges readily dewatered on both sand and soil beds.

CALCULATION OF ADVECTIVE MASS TRANS-PORT IN HETEROGENEOUS MEDIA.
Daly, C.J., U.S. Army Research Office, Report No.831, Conference of Army Mathematicians, 28th, [1983], Transactions, [1983], p.73-89, 12 refs.
38-2506

POROUS MATERIALS, MASS TRANSFER, GROUND WATER, FLUID DYNAMICS, ANAL-YSIS (MATHEMATICS).

YSIS (MATHEMATICS).

A coupled analytical/numerical procedure for prediction of solute transport in heterogeneous media is described. The procedure consists of an analytic solution of the hydraulic equations, followed by a numerical solution for solute transport using the method of characteristics. The characteristics are determined by fourth-order Runge-Kutta and predictor-corrector algorithms. Accuracy of solute transport calculation is enhanced by the fact that fluid velocity can be directly obtained at a priori undetermined points in the flow field. The solute transport process is considered to be entirely advective, neglecting the effects of mechanical dispersion and molecular diffusion. Evidence is presented to demonstrate that purely advective processes in both heterogeneous and homogeneous media can produce large "apparent dispersion." Such dispersion is shown to be easily capable of overwhelming any reasonable estimates of dispersion or diffusion based upon laboratory analyses of homogeneous media. For groundwater contamination problems, it is concluded that precise definition of the spatial variability of hydraulic properties is crucial to the accurate determination of the trajectory of contaminated waters.

MP 1698

MP 1698 CHARACTERISTICS OF MULTI-YEAR PRES-SURE RIDGES.

Kovacs, A., International Conference on Port and Ocean Engineering under Arctic Conditions, 7th, Hel-sinki, Finland, April 5-9, 1983. Proceedings, Vol.3, Espoo, Valtion teknillinen tutkimuskeakus, 1983, p.173-182, 13 refs. 38-2727

36-277
PRESSURE RIDGES, ICE FLOES, ICE FORMATION, OFFSHORE STRUCTURES, ICE PRESSURE, ICE STRENGTH, HUMMOCKS, COMPRESSIVE PROPERTIES, SEA ICE.

PRESSIVE PROPERTIES, SEA ICE.

Multi-year pressure ridges and thick hummock floes are the most severe ice formations that offshore structures will probably have to resist in the Beaufort and Chukchi Sosa. Multi-year hummock fields 30 m thick have been measured near Prudhoe Bay, Alaska. This paper presents information on 11 multi-year pressure ridges. The ridges were found to be voidless, and contained ice with a mean brine-free density of about 0.84 mg/cu m.

The apparent unconfined compressive strength was about 7 to 8 MPs at -10 C. The strength increased with depth below sea level, and se expected, varied inversely with ice proresity. The salibeight-to-keel-depth ratios of these ridges are compared with observations made in the Beaufort and Chukchi Seas to show that the multi-year ridges in these areas have a relatively constant sali-height-to-keel-depth ratio of sbout 1 to 3.3.

MP 1699

SEA ICE ON THE NORTON SOUND AND AD-JACENT BERING SEA COAST.

Kovaca, A., International Conference on Port and Ocean Engineering under Arctic Conditions, 7th, Hel-sinki, Finland, April 5-9, 1983. Proceedings, Vol.4, Bepoo. Valtion teknillinen tutkimuskeakus, 1983, Espoo, Valtion te p.654-666, 17 refs. 38-2757

ICE MECHANICS, SEA ICE DISTRIBUTION, ICE OVERRIDE, ICE PILEUP, SHORES, OFFSHORE STRUCTURES.

Recent observations and historical accounts of sea ice on the shores of Norton Sound and the adjacent Bering Sea are presented. The movement and accumulation of sea ice on the shore was found to be a common event, as

were massive icings on island surfaces. See ice was found to have been pushed inland over 150 m and to have moved over 15 km inland during high storm seas.

MP 1700 OCEAN CIRCULATION: ITS EFFECT ON SEA-SONAL SEA-ICE SIMULATIONS.

Hibler, W.D., III, et al, Science, May 4, 1984, 224(4648), p.489-492, 13 refs.

38-2846

SEA ICE, SEASONAL VARIATIONS, ICE WATER INTERFACE, ICE EDGE, MODELS, EN-VIRONMENT SIMULATION, OCEAN CUR-

A diagnostic ice-ocean model of the Arctic, Greenland, and Norwegian seas is constructed and used to examine the Norwegian seas is constructed and used to examine role of ocean circulation in seasonal sea-ice simulati. The model includes steral ice motion and three-dimensions of the control of the ocean circulation. The ocean portion of the model is weakly forced by observed temperature and salinity data. Simulation results show that including modeled ocean circulation in seasonal teat-ice simulations substantially improves the predicted ice drift and ice margin location. Simulations that do not include lateral ocean movement predict a much least realistic ice actes. less realistic ice edge.

MP 1701

SEA ICE STRUCTURE AND BIOLOGICAL ACTIVITY IN THE ANTARCTIC MARGINAL ICE ZONE.

Clarke, D.B., et al, *Journal of geophysical research*, Mar. 20, 1984, 89(C2), p.2087-2095, 30 refs.

Ackley, S.F. 38-2917

36-291/ SEA ICE, ICE CORES, ICE COMPOSITION, AL-GAE, CRYOBIOLOGY, FRAZIL ICE, ANTARC-TICA—WEDDELL SEA.

Ite cores obtained during October-November 1981 from Weddell Sea pack ice were analyzed for physical, chemical, and biological parameters. Frazil ice, which is associated with dynamic, turbulent conditions in the water column, predominated (70%). Both floe thickness and salinity indicate ice which is less than 1 year old. Chemical analyses, particularly with regard to the nutrients, revealed a complex picture. Phosphate values are cattered relative to the dilution curve. Nitrate and silicate values are lower than expected from simple scaling with salinity and suggest diatom growth within the ice. Nitrite values are higher in the ice than in adjacent waters. Frazil ice formation which probably concentrates algal cells from the water column into ice floes results in higher initial chlorophyll a by subsequent reproduction within the ice. Ice core chlorophyll ranged from 0.09 to 3.8 mg/cu m, comparable to values previously reported for this area but significantly lower than values for Antarctic coastal fast ice. The dominance of frazil ice in the Weddell is one of the major differences between this are and others. Consequently, we believe that ice structural conditions significantly influence the biological cummunities in the ice. (Auth.) Ice cores obtained during October-November 1981 from Wed-

MP 1702

FIXED MESH FINITE ELEMENT SOLUTION FOR CARTESIAN TWO-DIMENSIONAL PHASE CHANGE.

O'Neill, K., Journal of energy resources technology, Dec. 1983, 105(4), p.436-441, 28 refs.

FREEZE THAW CYCLES, HEAT TRANSFER, PHASE TRANSFORMATIONS, HEAT CAPACI-TY, TEMPERATURE EFFECTS.

MP 1703 LOW TEMPERATURE AUTOMOTIVE EMIS-SIONS.

Coutts, H.J., Alaska. Department of Transportation and Public Facilities. Report, Nov. 1983, AK-RD-84-9, 2 vols. 38-3041

COLD WEATHER OPERATION, AIR POLLU-TION, ENGINES, FUELS, VEHICLES, WINTER MAINTENANCE, TESTS.

MP 1704

FROST ACTION AND ITS CONTROL.

Berg, R.L., ed, New York, American Society of Civil

Engineers, 1984, 145p., Refs. passim. For individual
papers see 38-3082 through 38-3085.

Wright, E.A., ed.

38-3081

58-3081
FROST ACTION, FROST HEAVE, FROST RE-SISTANCE, SOIL FREEZING, HEAT TRANS-FER, SOIL STRENGTH, PERMAFROST BENEATH STRUCTURES, ICE LENSES, DE-SIGN, COUNTERMEASURES, FOUNDATIONS,

MP 1705

DESIGNING FOR FROST HEAVE CONDI-TIONS

Crory, F.E., et al, Frost action and its control. Edited by R.L. Berg and E.A. Wright, New York, American Society of Civil Engineers, 1984, p.22-44, 41 refs. Isaaca, R.M., Penner, E., Sanger, P.J., Shook, J.F. 38-3083

38-3083
FROST HEAVE, HEAT TRANSFER, FROST PENETRATION, SOIL FREEZING, FOUNDATIONS, ARTIFICIAL FREEZING, ROADBEDS, UNDERGROUND PIPELINES, COLD STORAGE, PAVEMENTS, DESIGN.

DESIGN IMPLICATIONS OF SUBSOIL THAW-ING.

Johnson, T.C., et al, Frost action and its control. Edited by R.L. Berg and E.A. Wright, New York, American Society of Civil Engineers, 1984, p.45-103, 136 refa

McRoberts, E.C., Nixon, J.F.

38-3084 GROUND 38-3084
GROUND THAWING, PERMAFROST
BENEATH STRUCTURES, FROZEN GROUND
TEMPERATURE, FREEZE THAW CYCLES,
THERMAL REGIME, FROST HEAVE, DESIGN,
GEOTHERMY, SHEAR STRENGTH, SETTLEMENT (STRUCTURAL), SLOPE PROTECTION,
COUNTERMEASURES, SOIL STABILIZATION.

MP 1707 SURVEY OF METHODS FOR CLASSIFYING FROST SUSCEPTIBILITY.

Chamberlain, E.J., et al. Frost action and its control. Bdited by R.L. Berg and B.A. Wright, New York, American Society of Civil Engineers, 1984, p.104-141, 36 refa.

Gaskin, P.N., Esch, D., Berg, R.L.

38-3085 SOIL FREEZING, FROST RESISTANCE, FROST HEAVE, SOIL STRENGTH, ROADS, AIRPORTS, CLASSIFICATIONS, GRAIN SIZE, SEASONAL FREEZE THAW.

MP 1708

DEPENDENCE OF CRUSHING SPECIFIC ENERGY ON THE ASPECT RATIO AND THE STRUCTURE VELOCITY.
Sodhi, D.S., et al., Offshore Technology Conference, 16th, Houston, Texas, May 7-9, 1984. Proceedings.
Vol.1, 1984, p.363-374, 18 refs.

Morris, C.E. 38-3229

36-3229 ICE PRESSURE, OFFSHORE STRUCTURES, ICE CRACKS, ICE COVER THICKNESS, ICE STRENGTH, DYNAMIC LOADS, ICE SHEET, VELOCITY, EXPERIMENTATION, COMPRES-SIVE PROPERTIES, SPECIFIC HEAT, ARTIFI-CIAL ICE.

CIAL ICE.

An experimental study was undertaken to determine the dependence of crushing specific energy of urea ice on the aspect ratio (structure diameter/ice thickness) and the structure velocity. The experiments were conducted by pushing an instrumented, vertical, cylindrical structure into ice sheets at different velocities. Two parameters were varied during the experimental program: diameter (50 to 500 mm) and velocity (10 to 210 mm/s). The urea concentration was changed slightly from 0.84 to 0.93% by weight. The results are presented graphically to show the dependence of the ratio of specific energy to unconfined uniaxial compressive strength on the aspect ratio for different ratios of velocity to ice thickness.

MP 1709 COMPARISON OF AERIAL TO ON-THE-ROOF INFRARED MOISTURE SURVEYS.

Korhonen, C., et al, International Conference on Thermal Infrared Sensing for Diagnostics and Control (Thermosense 6), Oak Brook, IL, Oct. 2-5, 1983. Proceedings, Society of Photo-Optical Instrumentation Engineers. Proceedings, Vol.446, [1983], p. 95.105.6 prf. p.95-105, 6 refs.

obiasson, W., Greatorex, A. 38-3274

MOISTURE DETECTION, ROOFS, INFRARED PHOTOGRAPHY, TEMPERATURE MEASURE-MENT, INSULATION.

MBNT, INSULATION.

Prior research by the Corps of Engineers has shown aerial thermography to be useful as a reconnaissance tool for finding wet roof insulation. This conclusion was based on findings from thermal line scanners flown at about 1000 feet in military fixed-wing aircraft and from hand-held thermal imagers flown at about 500 feet in military helicopters. During the spring of 1983 a comprehensive serial to on-the-roof infrared comparison study was conducted on several roofs at Fort Devens, Massachusetts. These recent studies confirm our earlier opinion that oblique thermography is generally of reconnaissance value only. However, "straight-down thermography from either fixed-wing aircraft or from helicopt-

ers can be used to produce reasonably accurate maps of wet roof areas. The most accurate maps were produced by thermal imaging systems in a helicopter hovering as close as 200 feet above a roof. This study suggests that some forms of airborne thermography can be of more value than just a reconnaissance tool in finding wet roof insulation. Of course, a visual examination of each roof along with a few core samples are still needed before recommendations

MP 1710

POTENTIAL RESPONSES OF PERMAFROST TO CLIMATIC WARMING. Goodwin, C.W., et al, Potential effects of carbon diox-

ide-induced climatic changes in Alasks; The proceedings of a conference. Edited by J.H. McBeath, Fairbanks, University of Alaska, Mar. 1984, p.92-105, 37 refs.

Brown, J., Outcalt, S.I.

PERMAPROST DISTRIBUTION, PERMAPROST THERMAL PROPERTIES, CLIMATIC CHANGES, ACTIVE LAYER, CARBON DIOXIDE, TUNDRA, THERMOKARST DEVELOPMENT, THAW DEPTH, STEFAN PROBLEM, HEAT TRANSFER, SOIL TEMPERATURE, SNOW DEPTH.

SNOW DEPTH.

Permafrost is generally divided into two zones from north to south: continuous and discontinuous. At its southern limit, permafrost in Alaska exists in isolated masses under peat. In the northern portion of the continuous zone, permafrost occurs everywhere near the surface of the entire landscape with the exception of deep lakes and river channels. The presumed warming of the ground in the discontinuous zone due to CO2-induced climatic change will result in an areal reduction of permafrost. In the colder areas, continuous-zone permafrost temperatures will rise and summer active-layer depths will increase, but the spatial extent of permafrost will only be marginally affected. In both case, where there is ground ice, thermal erosion and thaw consolidation will produce thermolarist terrain.

MP 1711

MODELING RAPIDLY VARIED FLOW IN TAIL-WATERS.
Ferrick, M.G., et al, Water resources research, Feb.

1984, 20(2), p.271-289, 22 refs. Bilmea, J., Long, S.E. 38-3317

RIVER FLOW, WAVE PROPAGATION, CHANNELS (WATERWAYS), DAMS, MATHEMATICAL MODELS, ELECTRIC POWER.

CAL MODELS, ELECTRIC POWER.

An understanding of the downstream propagation of sharpfronted, large-amplitude waves of relatively short period is
important for describing rapidly varying flows in tailwaters
of hydroelectric plants and following the breach of a dam.
We developed a numerical model of these waves by first
identifying the primary physical processes and then performing
an analysis of the solution. A linear analysis of the dynamic
open channel flow equations provides relationships describing
flow wave advection, diffusion, and dispersion in rivers. A
one-dimensional diffusion wave model modified for application
to tailwaters simulates the important physical processes and
is straightforward to apply. is straightforward to apply.

ICE-RELATED FLOOD FREQUENCY ANALYSIS: APPLICATION OF ANALYTICAL ESTI-

Gerard, R., et al, International Specialty Conference on Cold Regions Engineering, 3rd, Edmonton, Alber-ta, April 4-6, 1984. Proceedings, Edmonton, Uni-versity of Alberta, 1984₃, p.85-101, 12 refs. Calkins, D.J. 38-347N

FLOOD FORECASTING, RIVER ICE, ICE JAMS, ICE CONDITIONS, ANALYSIS (MATHEMAT-ICS).

ld regions ice-related floods can make a sign and often dominant, contribution to the flood population. They should therefore be considered in a flood frequency analysis. However, in many instances, historical data for this purpose is lacking. Resort must then be made to analytical estimates of ice-related flood stages. This paper describes the determination and application of such estimates for a site on the Missisquoi River near Richford, Vermont.

MP 1713

ST. LAWRENCE RIVER PREEZE-UP FORE-CAST.

CAST.
Shen, H.T., et al, International Specialty Conference on Cold Regions Engineering, 3rd, Edmonton, Alberta, April 4-6, 1984. Proceedings, Edmonton, University of Alberta, 1984, p.177-190, 13 refs. Foltyn, B.P., Daly, S.F. 38-3476

RIVER ICE, FREEZEUP, ICE FORMATION, ANALYSIS (MATHEMATICS), FORECASTING, AIR TEMPERATURE, WATER TEMPERATURE, CANADA—SAINT LAWRENCE RIVER.

An important element of the ice management in northern rivers is forecasting water temperatures to predict the time

of ice formation. The freeze-up forecast provides needed information for planning flow regulations and scheduling of the close of a navigation season. In this paper, the relationship between variations of sir temperature and water reissionance between variations of air temperature and water temperature is analyzed. An analytical expression for water temperature is obtained through the solution of a simplified convection-diffusion equation. The air temperature is repre-sented as a combination of a harmonic function and short term fluctuations. The short term fluctuations are deter-mined from National Weather Services forecasts.

MP 1714 WATER SUPPLY AND WASTE DISPOSAL ON PERMANENT SNOW FIELDS.

Reed, S.C., et al, International Specialty Conference on Cold Regions Engineering, 3rd, Edmonton, Alberta, April 4-6, 1984. Proceedings, Edmonton, University of Alberta, 1984, p. 401-413, 13 refs.
Bouzoun, J.R., Tobiasson, W. 38-3492

36-3422 WATER SUPPLY, WASTE DISPOSAL, SNOW COVER, WATER TREATMENT, UTILITIES, SNOW MELTING, DESIGN, WATER CHEMIS-

This paper summarizes procedures and techniques for providing a water supply and for safe watewater disposal at stations and camps on permanent snow fields. These range from temporary and transient field operations to large scale, permaently occupied facilities.

MP 1715 MODELING THE RESILIENT BEHAVIOR OF FROZEN SOILS USING UNFROZEN WATER

Cole, D.M., International Specialty Conference on Cold Regions Engineering, 3rd, Edmonton, Alberta, April 4-6, 1984. Proceedings, Edmonton, University of Alberta, 1984, p.823-834, 14 refs. 38-3518

38-33-18
FROZEN GROUND MECHANICS, RHEOLOGY,
UNFROZEN WATER CONTENT, ICE SOLID INTERFACE, SURFACE PROPERTIES, PARTICLES, FROZEN GROUND TEMPERATURE, ICE
CRYSTAL STRUCTURE, MODELS, SALINITY. CRYSTAL STRUCTURE, MODELS, SALINITY.

A layer of unfrozen water exists between the soil particle surface and the solid ice phase in a frozen soil at temperatures of practical concern. This layer owes its existence to the effect of field forces associated with the soil particle surfaces. Its thickness depends on factors such as temperature, solute concentration and specific surface area. Additional unfrozen water occurs within the polycrystalline pore ice as well. The thickness of the unfrozen water layer strongly affects the mechanical behavior of the soil-ice interface and, hence, the gross mechanical properties of the frozen soil. The total unfrozen water content is particularly useful since it reflects the contributions from a number of sources to the unfrozen water layer thickness. As a consequence, the unfrozen water content provides an excellent means for temperature, salinity and specific surface area.

MP 1716 ICE RESISTANCE TESTS ON TWO MODELS OF THE WIGB ICEBREAKER.

Tatinclaux, J.C., et al, American Towing Tank Conference; General meeting, 20th, Hoboken, NJ, Aug. 2-4, 1983. Proceedings. Edited by D. Savitsky, J.F. Dalzell and M. Palazzo, [1984], p.627-638, 6 refs. Humphreys, D.H.

ICEBREAKERS, ICE MODELS, ICE BREAKING, ICE STRENGTH, ICE LOADS, STRENGTH, MODELS, TESTS.

PHYSICAL MECHANISM FOR ESTABLISHING ALGAL POPULATIONS IN FRAZIL ICE. Carrison, D.L., et al, Nature, Nov. 24, 1983, 306(5941), p.363-365, 19 refs.
Ackley, S.F., Buck, K.R.
38-3424

ALGAE, FRAZIL ICE, MARINE BIOLOGY, ICE FORMATION, CRYOBIOLOGY, ANTARCTICA —WEDDELL SEA, ANTARCTICA—MCMURDO

SOUND.

In polar regions ice algal communities are not only conspicuous but may also be important production sites and sources of seed populations for pelagic communities. Except for some studies area land-based stations, there are few long-term observations of ice algal populations, and few studies have considered how they form and develop. Duttli now, neither the mechanism for harvesting nor the effects on the composition of the ice community has been clearly demonstrated. In the Weddell Sea, we have sampled young sea ice diacoloured by algae, and we present evidence that the algae were concentrated by a physical mechanism. We explain how such a process may accumulate planktonic forms in ice communities. (Auth. mod.)

MF 1718
WATER QUALITY MONITORING USING AN AIRBORNE SPECIRORADIOMETER.
McKim, H.L., et al. Photogrammetric engineering and remote sensing, Mar. 1984, 50(3), p.353-360, 9 refs.
Merry, C.J., Layman, R.W.
38-3554
SUSPENDED SERVICENTS PARIOMETER

RADIOMETRY, SUSPENDED SEDIMENTS, RADIOMETRY SPECTRA, LAKE WATER, RESERVOIRS, RIV ERS, AIRBORNE EQUIPMENT, SUNLIGHT.

ERS, AIRBORNE EQUIPMENT, SUNLIGHT. An airborne 500-channel spectroradiometer developed and built by Chiu and Collins (1978) was tested to determine its usefulness to the U.S. Army Corps of Engineers for monitoring the suspended load in lakes, reservoirs, and waterways. Field and laboratory experiments were run to test and evaluate the radiometer's response to various levels of suspended organic and inorganic materials. A procedure to separate the sun gint, which is often a large percentage of the recorded signal, from the total signal was investigated. Results indicated that the socuracy of the airborne water turbidity measurements was sufficient to meet certain monitoring requirements of the Corps of Engineers.

MP 1719 SELF-SHEDDING OF ACCRETED ICE FROM

HIGH-SPEED ROTORS.
Itagaki, K., American Society of Mechanical Engineers. Winter Annual Meeting, 1983, 83-WA/HTneers. Winter A. 68, p.1-6, 16 refs. 38-3565

J8-3903 ICE REMOVAL, AIRCRAFT ICING, PROPEL-LERS, ICE ACCRETION, SUPERCOOLED FOG, ICE ADHESION, ICE SOLID INTERFACE, SUR-PACE ENERGY, ICE CRACKS, ICE COVER THICKNESS, HELICOPTERS, ANALYSIS THICKNESS, H (MATHEMATICS).

(MATHEMATICS).

Le accreted on high-speed rotors operating in supercooled fog can be thrown off by centrifugal force, causing severe unbalance and creating dangerous projectiles. A simple force belance analysis indicates that the strength of accreted ice (and its adhesive strength) can be obtained by measuring the thickness of the accretion, the location of the separation, and the density. Such an analysis was applied to field and laboratory observations of self-shedding events. The results agree reasonably well with other observations.

MP 1720 ASYMPTOTIC BEHAVIOUR OF SOLUTIONS TO THE PROBLEM OF WETTING FRONTS IN ONE-DIMENSIONAL, HORIZONTAL AND INFINITE POROUS MEDIA.

Nakano, Y., Advances in water resources, June 1983, 6(2), p.71-78, 26 refs. 38-3567

POROUS MATERIALS, SOIL WATER, DIFFU-SION, WETTABILITY, ANALYSIS (MATH-EMATICS), WATER CONTENT, EXPERIMEN-TATION.

TATION.

The saymptotic behavior of solutions to the problem of wetting fronts is studied in one-dimensional, horizontal and infinite porous media with the soil-water diffusivity proportional to some power of the water content. The uniqueness of the similarity solution for the problem is studied and the properties of this solution are presented. It is shown that the similarity solution is an asymptotic solution of a wide class of initial value problems of wetting fronts in the media. The use of the similarity solution is discussed for the experimental determination of the soil-water diffusivity.

SIMILARITY SOLUTIONS TO THE SECOND BOUNDARY VALUE PROBLEM OF UN-SATURATED FLOW THROUGH POROUS

Nakano, Y., Advances in water resources, Dec. 1983, 6(4), p.205-213, 26 refs. 38-3568

J8-3508 POROUS MATERIALS, WATER FLOW, BOUND-ARY VALUE PROBLEMS, SOIL WATER, DIFFU-SION, WATER CONTENT, ANALYSIS (MATH-EMATICS).

EMATICS).

Similarity solutions to the second boundary value problem of unsaturated flow are studied in one-dimensional, semi-infinite porous media with the soil-water diffusivity proportional to some power of the water content. The existence and uniqueness of two types of similarity solutions to the problem are investigated and the properties of these solutions are presented. It is shown that these two types of similarity solutions exist and that they may not be unique for every parameter range studied. The use of the similarity solutions is discussed for the experimental determination of soil-water diffusivity.

PILING IN PROZEN GROUND.

Crory, F.E., American Society of Civil Engineers.

Technical Councils. Journal, May 1982, 108(TC1),

Technical Councils. Journal, May 1982, 108(TC1), p.112-124, 30 refs. 36-3206
PILE STRUCTURES, FROZEN GROUND STRENGTH, PERMAFROST THERMAL PROPERTIES, FREEZE THAW CYCLES, COLD WEATHER CONSTRUCTION, LOADS (FORCES), FOUNDATIONS, FROST HEAVE, BEARING STRENGTH.

MP 1723 TEMPERATURE AND FLOW CONDITIONS DURING THE FORMATION OF RIVER ICE. DURING THE FORMATION OF RIVER ICE. Ashton, G.D., et al, Symposium on Ice and its Action on Hydraulic Structures, Reykjavik, Iceland, Sept. 7-10, 1970. Papers and discussions, Reykjavik, Iceland, International Association for Hydraulic Research, 1970, 12p., In English with French summary. Session 2.4. 4 refs. Includes discussions. Kennedy, J.F.

28-3971 RIVER ICE, ICE FORMATION, FLOW RATE, THERMAL REGIME, WATER TEMPERATURE.

RESILIENT MODULUS AND POISSON'S RATIO FOR FROZEN AND THAWED SILT AND CLAY SUBGRADE MATERIALS.

Chamberlain, B.J., et al, Preprints of papers presented at a specialty session of the ASCE Fall Convention and Exhibit, San Francisco, California, Oct. 17-21, 1977, American Society of Civil Engineers, 1977, p.229-281,

Cole, D.M., Johnson, T.C.

ROADS, SUBGRADE SOILS, SEASONAL FREEZE THAW, SOIL STRENGTH, LABORATO-RY TECHNIQUES.

MP 1725 ELECTRON MICROSCOPE ANALYSIS OF ARCOSOLS IN SNOW AND DEEP ICE CORES FROM GREENLAND.

FROM GREENLAND. Kumai, M., International Association of Hydrological Sciences. Publication, 1977, No.118, International Symposium on Isotopes and Impurities in Snow and Ice, Grenoble, Aug. 28-30, 1975, p.341-350, In English with French summary. 10 refs.

32-3852 ELECTRON MICROSCOPY, AEROSOLS, SNOW COVER, ICE CORES.

GENERAL REPORT SESSION 2: MECHANICAL PROPERTIES.

Ladanyi, B., et al, Engineering geology, 1979, Vol.13, p.7-18, 5 refs.
Sayles, F.H.
36-1421

36-1421
FROZEN GROUND MECHANICS, FROZEN
GROUND STRENGTH, CONSTRUCTION
MATERIALS, ARTIFICIAL FREEZING, ICE
LENSES, GROUND ICE, TEMPERATURE
GRADIENTS, DESIGN, PERMAFROST.

TEMPERATURE STRUCTURE AND INTER-FACE MORPHOLOGY IN A MELTING ICE-WATER SYSTEM.

Yen, Y.-C., Frontiers in hydrology, Littleton, CO, Water Resources Publications, 1984, p.305-325, 22 refs. 38-3800

36-3600 ICE WATER INTERFACE, MELTING POINTS, HEAT TRANSFER, TEMPERATURE DISTRIBUTION, WATER TEMPERATURE, BOUNDARY LAYER, CONVECTION, TURBULENT FLOW.

Nineteen tests were conducted with temperature measurements at various stages of melting experiments. Pourteen sets of photos were taken at various stages of the experiment for melting from above. Formation of concentric ridges was observed only for higher warmer boundary temperatures. However, there were more sharp-edged cavities at lower warm boundary temperatures as compared to those at warmer temperatures. The ice-water interface assemed to be much amoother at the junction of the cells in melting from bove, the convective motions originate near the water-ice interface and therefore, may possess a greater intensity.

EFFECTS OF VOLUME AVERAGING ON SPECTRA MEASURED WITH A LYMAN-ALPHA HY-GROMETER.

Andreas, B.L., Journal of applied meteorology, Apr. 1981, 20(4), p.467-475, 24 refs. 38-3865

HYGROMETERS, HUMIDITY, SPECTROS-COPY, MEASURING INSTRUMENTS, ANAL-YSIS (MATHEMATICS), VOLUME, ACCURACY. YSIS (MATHEMATICS), VOLUME, ACCURACY. Because the Lyman-alpha bygrometer averages turbulent fluctuations in humidity over a right circular cylinder, the spectral response of the instrument degrades at higher wavenumbers. This paper contains a derivation of the three-dimensional spectral averaging function and uses this function, with a new model for the scalar spectrum, to numerically evaluate how this spatial averaging affects measured humidity spectra and humidity variance dissipation rates. In general, hygrometer parameters can be chosen that allow spectral measurements to moderately high werenumbers; but with the size of source and detector tubes currently in use, an accurate measurement of the humidity variance dissipation rate appears impossible. AMP 1729.

MP 1729 LOCATING WET CELLULAR PLASTIC INSU-LATION IN RECENTLY CONSTRUCTED ROOPS.

Korhonen, C., et al, Society of Photo-Optical Instrumentation Engineers. Vol.371, p.168-173, 7 refs. strumentation Proceedings, 1983,

Tobiasson, W. 38-131

CELLULAR PLASTICS, ROOFS, INSULATION, MOISTURE DETECTION, WETTABILITY, TEMPERATURE MEASUREMENT.

MOISTURE DETECTION, WETTABILITY, TEMPERATURE MEASUREMENT.

Infrared scanners are quite successful in finding wet roof
insulation, especially boards of rapidly shoorbing insulations
like perfite, wood fiber and fibrous glass. But wet areas
develop more slowly and nonuniformly in the cellular plastic
insulations, such as wrethane, which are commonly used
in new roofs. These differences can affect the outcome
of an infrared survey of new roofs. To determine the
feasibility of detecting incipient wet insulation, several recently
constructed roofs were examined thermographically. It
was usually more difficult to find moisture in new roofs
containing cellular plastic insulations than in new roofs with
more-absorbent insulations. This increased difficulty is
due to the slower rate of wetting and to the nonuniform
manner of wetting of some of the cellular plastics. Perfite,
wood fiber and fibrous glass insulations tend to become
uniformly wet throughout an entire board, whereas moisture
initially concentrates at the perimeters of boards of some
cellular plastic insulations. However, eight to ten months
after construction, enough moisture can accumulate in most
cellular plastic insulations to be visible to an infrared scanner.
Since this moisture is concentrated in a small portion of
each insulation board, much of it would probably be overlooked
by a nuclear or capacitance grid survey.

MP 1730

MP 1730 FOUNDATIONS IN PERMAPROST AND SEA-SONAL FROST; PROCEEDINGS.

Session 1001 Foundations in Permafrost and Seasonal Frost, Denver, CO, Apr. 29, 1985, New York, American Society of Civil Engineers, 1985, 62p., Refs. passim. For individual papers see 39-3579 through

Wuori, A.F., ed, Sayles, F.H., ed.

39-3578
PERMAFROST BENEATH STRUCTURES,
FOUNDATIONS, PILE STRUCTURES, RHEOLOGY, FROZEN GROUND MECHANICS, LOADS
(FORCES), SEASONAL FREEZE THAW, MEETINGS, DESIGN, COLD WEATHER CONSTRUCTION, SNOW COVER EFFECT, GROUND ICE.

CREEP OF A STRIP FOOTING ON ICE-RICH PERMAFROST.

PERMAPKUSI.
Sayles, F.H., Session on Foundations in Permafrost and Seasonal Frost, Denver, CO, Apr. 29, 1985. Proceedings. Edited by A. Wuori and F.H. Sayles, New York, American Society of Civil Engineers, 1985, p.29-51, 41 refs. 39-3581

PERMAFROST BENEATH STRUCTURES, CREEP, LOADS (FORCES), STRESSES, SETTLE-MENT (STRUCTURAL), RHEOLOGY, STRAINS, TESTS, COMPRESSIVE PROPERTIES.

TESTS, COMPRESSIVE PROPERTIES.

Creep settlement tests were performed on a strip footing founded on the surface of ice-rich seolian silt permafrost. The tests consisted of applying four step loadings to a 10 in. (25.4 cm) wide concrete footing. The step loads produced constant stresses at the base of the footing of 28, 56, and 111 psi (0.193, 0.385, and 0.770 MPs) for test periods of 12000, 6000 and 3500 hours respectively. The testing was conducted at an ambient temperature of 28.4 F (-2.0 C) in the controlled environment of the USACRREL. Permafrost Tunnel Facility which is located near Pox, Alaska. Settlement and settlement rates of the footing were measured these measured values are compared with those computed by different proposed analytical methods that utilize results from unconfined compression creep tests performed on undis-

turbed soil taken from the testing site. Preliminary results indicate reasonable agreement between computed and measured values.

MP 1732 FROST HEAVE FORCES ON PILING.

Each, D.C., et al, Alaska. Department of Transporta-tion and Public Facilities. Research notes, May 1985, 4(11), 2p.

Johnson, J.B. 40-508

40-508
PROST HEAVE, PILE EXTRACTION, PILE
STRUCTURES, LOADS (FORCES), FROST
PENETRATION, PROZEN GROUND MECHANICS, SOIL CREEP, SOIL PHYSICS, DESIGN, TESTS

MP 1733

MEAN CHARACTERISTICS OF ASYMMETRIC PLOWS: APPLICATION TO FLOW BELOW ICE

Gogus, M., et al, Canadian journal of civil engineering, Sep. 1981, 8(3), p.342-350, With French summary.

Tatinclaux, J.C.

30-1795
ICE JAMS, FLOATING ICE, WATER FLOW, SUB-SURFACE INVESTIGATIONS, SURFACE ROUGHNESS, SHEAR STRESS, RIVER ICE, HY-DRAULICS, ANALYSIS (MATHEMATICS),

MP 1734 GROUND SNOW LOADS FOR STRUCTURAL DESIGN.

Bllingwood, B., et al, Journal of structural engineering, Apr. 1983, 109(4), p.950-964, 13 refs. Redfield, R.

SNOW LOADS, ROOFS, SNOW EQUIVALENT, STANDARDS, STANDARDS, STANDARDS, STRUCTURES, DESIGN. SNOW STATISTICAL

MP 1735 SEWAGE SLUDGE AIDS REVEGETATION. Palazzo, A.J., et al, *Military engineer*, July-Aug. 1982, 74(481), p.198-301.

Gaskin, D.A., Wright, E.A.
38-3797

SEWAGE DISPOSAL, SLUDGES, REVEGETA-TION, SOIL FORMATION, GRASSES, GROWTH. MP 1736

SOFT DRINK BUBBLES.

Cragin, J.H., Journal of chemical education, Jan. 1983, Vol.60, p.71, 2 refs. 38-3798

ICE WATER INTERFACE, BUBBLES, ICE MELT-ING, AIR ENTRAINMENT, CARBON DIOXIDE, NUCLEATION, AIR WATER INTERACTIONS,

MP 1737 COMPARISON OF DIFFERENT SEA LEVEL PRESSURE ANALYSIS FIELDS IN THE EAST

GREENLAND SEA.
Tucker, W.B., Journal of physical oceanography, June 1983, 13(6), p.1084-1088, 7 refs.

ATMOSPHERIC PRESSURE, SEA LEVEL, SEA ICE, ICE MODELS, OCEANOGRAPHY, GREEN-LAND SEA.

OTTAUQUECNEE RIVER—ANALYSIS OF FREEZE-UP PROCESSES.
Calkins, D.J., et al, Workshop on Hydraulics of Ice-Covered Rivers, Edmonton, Alta., June 1 and 2, 1982. Proceedings, 1982₁, p.2-37, 3 refs. Gooch, G.

38-4001

38-4001
RIVER ICE, FREEZEUP, HEAT TRANSFER, ICE
MECHANICS, FLOW RATE, METEOROLOGICAL FACTORS, ICE COVER THICKNESS, ICE
VOLUME, TIME FACTOR, ANALYSIS (MATHEMATICS), DEGREE DAYS, UNITED STATES—
VERMONT—OTTAUQUECHEE RIVER.

VERMONT—OTTAUQUECHEE RIVER.

The results of three winters of freeze-up measurements on the Ottauquechee River have shown that the ice production heat transfer coefficient calculated from the ice volume measurements is somewhat related to the severity of the freeze-up meteorological conditions. A very intense cold period of -22 C for two days just as the river water temperature reached 0.0 C produced much higher ice volumes for the same river reach than two other freeze-up periods, which had average air temperatures of -7 C over 10 to 12 days. The intense cold period created higher ice discharges, which forced the leading edge to progress upstream at a faster rate than during other years. The lateral ice closure was found to be linearly related to the number of accumulated freezing degree-days. The data on lateral closure for this

amail river were also related to the freeze-up open channel flow velocity and, when combined with similar data from the Nelson River in Manitoba, produced a reasonable relationship. The sluth ice also established an equilibrium flow area at several measured cross sections throughout the study

FORCE MEASUREMENTS AND ANALYSIS OF RIVER ICE BREAK UP.

Deck, D.S., Workshop on Hydraulics of Ice-Covered Rivers, Edmonton, Alta., June 1 and 2, 1982. Pro-ceedings, (1982), p.303-336, 19 refs.

38-4013 ICE PRESSURE, STRUCTURES, ICE ICE LOADS, ICE PRESSURE, STRUCTURES, ICE BREAKUP, RIVER ICE, ICE CONTROL, ICE BOOMS, ICE FORECASTING, ICE MECHANICS, FLOATING ICE, COUNTERMEASURES, FRAZIL ICE, DESIGN.

ZIL ICE, DESIGN.

Measurements were made near Oil City, Pennsylvania, during February 1981 to evaluate the performance of a floating ice control structure during an ice run on a shallow and steep stream, Oil Creek. The primary objective of the structure was to assist in forming an early, stable ice cover upstream of Oil City that would prevent prolonged frazil ice generation. The control structure was a double timber ice boom. This paper focuses on the forces exerted on the structure during ice breakup. The forces transmitted to the ice control structure prior to breakup and during the ice run were monitored through a strain-gaged tension link, which had been incorporated into the design of the structure, and this ice force was recorded with respect to time.

PREEZING OF A SEMI-INFINITE MEDIUM WITH INITIAL TEMPERATURE GRADIENT.

Lunardini, V.J., Journal of energy resources technology, Mar. 1984, 106(1), p.103-106, Revision of 37-2397. 12 refs. 38-4127

SOIL FREEZING, STEFAN PROBLEM, HEAT TRANSFER, TEMPERATURE GRADIENTS, GEOTHERMY, HEAT BALANCE, THERMAL CONDUCTIVITY, ANALYSIS (MATHEMATICS). CONDUCTIVITY, ANALYSIS (MATHEMATICS). Exact solutions to problems of conductive heat transfer with solidification are rare due to the nonlinearity of the equations. The heat balance integral technique is used to obtain an approximate solution to the freezing of a semi-infinite region with a linear, initial temperature distribution. The results indicate that the constant temperature Neumann solution is acceptable for soil systems with a goothermal gradient unless extremely long freezing times are considered. The heat balance integral will yield good solutions, with simple numerical work, even for nonconstant initial temperatures.

ICE ACTION ON TWO CYLINDRICAL STRUC-

Kato, K., et al, Journal of energy resources technology, Mar. 1984, 106(1), p.107-112, 17 refs. For another source see 38-641 (MP 1643). Sodhi, D.S.

ICE LOADS, OFFSHORE STRUCTURES, ICE PRESSURE, ICE SOLID INTERFACE, EXPERIMENTATION.

PERIMENTATION.

Ice action on two cytindrical structures, located side by side, has been investigated in a small-scale experimental study to determine the interference effects on the ice forces generated during ice structure interaction. The proximity of the two structures changes the mode of ice failure, the magnitude and direction of ice forces on the individual structure, and the dominant frequency of ice force variations. Interference effects were determined by comparing the experimental results of tests at different structure spacings.

MP 1742 THERMAL PATTERNS IN ICE UNDER DY-NAMIC LOADING.

Fish, A.M., et al, Society of Photo-Optical Instrumentation Engineers. Proceedings, 1983, Vol. 430, p.240-243, 9 refs.

Marshall, S.J., Munis, R.H.

ICE PHYSICS, DYNAMIC LOADS, HEAT TRANSPER, ICE SPECTROSCOPY, ICE THER-MAL PROPERTIES, PLATES, TESTS.

MAL PROPERTIES, PLATES, TESTS.

Heat emission patterns in the infrared spectrum were discovered in ice subjected to cyclic loading. The ice plates used in the tests had a rectangular shape of 13 x 19 cm and a thickness of 2 cm. The plates were frozen to the platen of the testing apparatus to form a cantilever beam and were vibrated over a frequency range from 0.5 to 5 kHz at an ambient temperature of 4 C. The surface heat patterns were acanned by two thermal imaging systems with spectral band passes of 2.5.6 micron and 3-14 micron, and the heat patterns were recorded on Polaroid film and on videotape. The heat emission patterns first appeared at the fixed end of the ice plate and migrated gradually to the free end. The temperature difference between the ends was found to depend on the duration and frequency of excitation. The results of these tests indicate that vibrothermography can have wide areas of practical application

in the study of the origin and growth of defects, recrystalliza-tion, fatigue, and failure processes in ice.

OFFSHORE OIL IN THE ALASKAN ARCTIC. Weeks, W.F., et al, Science, July 27, 1984, 225(4660), p.371-378, Numerous refs. Weller, G. 38-417

NATURAL RESOURCES, OFFSHORE DRILL-ING, OIL RECOVERY, SEA ICE, ICE LOADS, ICE SCOPING

SCORING.
Oil and gas deposits in the Alaskan Arctic are estimated to contain up to 40 percent of the remaining undiscovered crude oil and oil-equivalent natural gas within U.S. jurisdiction. Most (65 to 70 percent) of these estimated reserves are believed to occur offshore beneath the shallow, ico-covered sees of the Alaskan continents! shelf. Offshore recovery operations for such areas are far from routine, with the primary problems associated with the presence of ice. Some problems that must be resolved if efficient, cost-effective, environmentally safe, year-round offshore production is to be achieved include the accurate estimation of ice forces on offshore structures, the proper placement of pipelines beneath ice-produced gouges in the sea floor, and the cleanup of oil spills in pack ice areas. (Auth.)

POTENTIAL USE OF SPOT HRV IMAGERY FOR ANALYSIS OF COASTAL SEDIMENT

Band, L.E., et al, 1984 SPOT Symposium. Proceedings. SPOT simulation applications handbook. American Society of Photogrammetry, 1984, p.199-204, 5 refs

McKim, H.L., Merry, C.J. 40-3548

BOTTOM SEDIMENT, SEDIMENT TRANS-PORT, REMOTE SENSING, WATER POLLU-TION, SPECTROSCOPY, DISTRIBUTION.

TION, SPECTROSCOPY, DISTRIBUTION.
Simulated SPOT (HVR) 20-m multispectral data were obtained on 7 July 1984 over the Hart-Miller Island diked spoil containment facility located in the upper Chesapeake Bay. Sediment plumes were clearly visible and indicated the sediment transport direction at the time the image was taken. The portion of the image along the bay side of the island had strong specular reflection. The image was preprocessed to remove the majority of the specular reflection. The Sobel operator was applied to the enhanced simulated SPOT image. A set of edge segments were generated that follow the boundaries of the major sediment plumes. The strength of the edges was quite variable, reflecting the varying diffusion of the plume border.

The Sobel edge-enhanced image showed two sets of plumes.

The edge intensity was generally stronger neares the source. Profiles of pixel digital number were taken at two distances, normal to the long axes of two sediment source areas.

EFFECTS OF PHASE III CONSTRUCTION OF THE CHENA PLOOD CONTROL PROJECT ON THE TANANA RIVER NEAR FAIRBANES, ALASKA—A PRELIMINARY ANALYSIS. Buska, J.S., et al, Overview of Tanana River monitor-ing and research studies near Fairbanks, Alaska. Pre-

pared by U.S. Army Cold Regions Research and Engipared by U.S. Army Course Regions Research and Engineering Laboratory, U.S. Army Corps of Rugineers, Jan. 1984, 11p. + figs., Appendix A. Barrett, S., Chacho, E.F., Collins, C.M., Young, S.A.

38-4207
FLOOD CONTROL, COLD WEATHER CON-STRUCTION, SOIL EROSION, RIVER FLOW, BANKS (WATERWAYS), AERIAL SURVEYS, PHOTOGRAPHY, COUNTERMEASURES, UNIT-ED STATES—ALASKA—TANANA RIVER.

ED STATES—ALASKA—TANANA RIVER.

The Alaska District, Corps of Engineers initiated a program called the Tanana River Monitoring and Research Program to determine if any adverse impacts are occurring or may occur as a result of Phase III construction of the Chena Flood Control Project. The results of the monitoring efforts and a preliminary analysis of the Phase III construction are presented in this report. Aerial photography and river cross-sections were used to document historical changes from 1961 to 1981. Riverbank erosion and channel changes before and after the Phase III construction are evaluated to determine the effects of the construction on the natural river process.

MP 1746 RELATIONSHIPS AMONG BANK RECESSION, VEGETATION, SOILS, SEDIMENTS AND PER-MAPROST ON THE TANANA RIVER NEAR FAIRBANES, ALASKA.

Gatto, L.W., Overview of Tanana River monitoring and research studies near Pairbanks, Alaska. Pre-pared by U.S. Army Cold Regions Research and Engi-neering Laboratory, U.S. Army Corps of Engineers, Jan. 1984, 59p., Appendix B. 30 refs. 38-4208

BANKS (WATERWAYS), SOIL EROSION, FLOOD CONTROL, VEGETATION, PERMA-FROST BENEATH RIVERS, SEDIMENTS, UNIT-ED STATES—ALASKA—TANANA RIVER.

ED STATES—ALASKA—TANANA RIVER.
The objective of this analysis was to determine if available data are useful in identifying the characteristics that contribute to crodibility of the banks along two reaches of the Tanans River. Existing data on bank vegetation, soils, sediments and permafrost were used.

Because these data were general and not collected for the purpose of site-specific analysis, my analytical approach was simple and did not include any statistical tests. The data were visually compared to the locations and estimated amounts of historical recession to evaluate if any relationships were obvious.

MP 1747 BANK RECESSION AND CHANNEL CHANGES IN THE AREA NEAR THE NORTH POLE AND FLOODWAY SILL GROTTS, TANANA RIVER,

Gatto, L.W., et al, Overview of Tanana River monitor ing and research studies near Fairbanks, Alsaka. Pre and research studies near Pairbanks, Alsaka. Prepared by U.S. Army Cold Regions Research and Engineering Laboratory, U.S. Army Corps of Engineers, Jan. 1984, 98p., Appendix C. 5 refs. Riley, K.W. 38-4209

BANKS (WATERWAYS), CHANNELS (WATER-WAYS), SOIL EROSION, FLOOD CONTROL, PHOTOGRAPHY, AERIAL SURVEYS, UNITED STATES—ALASKA—TANANA RIVER.

STATES—ALASKA—IANANA RIVER.

Two diversion groins, one near North Pole, Alsaka, and the other 7 miles upstream on the Tansna River near the floodway sill, were built in 1975 and 1979 along the flood control levee that protects Fairbanks from flooding of the Chena and Tansna rivers.

A flood control plan includes construction of new groins wherever it appears likely that bank crosion may threaten the levee. The objectives of this analysis were to measure bank reconstruction of the two groins, and to evaluate relationships among erosion, channel changes and discharge. Data from this analysis and future evaluations will be used in selectine sizes for thrive evening. groins, and to evaluate. Data from this analysis and managed and discharge. Data from this analysis and managed and selecting sites for future groins

MP 1/48 EROSION ANALYSIS OF THE NORTH BANK OF THE TANANA RIVER, FIRST DEFERRED

CONSTRUCTION AREA.

Collins, C.M., Overview of Tanana River monitoring and research studies near Fairbanks, Alaska. Prepared by U.S. Army Cold Regions Research and Engineering Laboratory, U.S. Army Corps of Engineers, Jan. 1984, 8p. + figs., Appendix D. 1 ref. 38.4210. 38-4210

BANKS (WATERWAYS), SOIL EROSION, FLOOD CONTROL, PROTECTION, AERIAL SURVEYS, UNITED STATES—ALASKA— TANANA RIVER

ROLE OF SEA ICE DYNAMICS IN MODELING CO2 INCREASES.

Hibler, W.D., III, American Geophysical Union. Geophysical monograph, 1984, No.29, p.238-253, 21

38-4249 CLIMATIC CHANGES, SEA ICE DISTRIBU-TION, ICE MECHANICS, ICE MODELS, ICE TEMPERATURE, DRIPT, THERMODYNAMICS, ALBEDO, SEA WATER.

ALBEDO, SEA WATER.

Sensitivity simulations of a hierarchy of Antarctic sea ice models to atmospheric warming are carried out and analyzed. The study includes models with only a thermodynamic ice cover, models with in-situ leads but no ice transport, and a fully coupled dynamic thermodynamic model that includes transport, leads and strength-thickness coupling. All models employ a 60-m-thick oceanic mixed layer, together with a spatially and temporally varying heat flux into the mixed layer from the deep ocean. The heat flux was generated layer from the deep ocean. The heat flux was generated interactively by using a fixed fraction of the ice growth and cooling rates from the full dynamic/thermodynamic model. The same spatially and temporally varying heat flux fields were used in all sensitivity simulations. Models including full ice dynamics effects are found to be less sensitive to atmospheric warming than thermodynamics-only models, with a thermodynamics-only models. (Auth. mod.)

MP 1750

MP 1730
PROJECTILE AND FRAGMENT PENETRATION INTO ORDINARY SNOW.
Swinzow, G.K., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1977,
30p., Unpublished manuscript. 10 refs. 30p., Unpublished manuscript. 38-4378

PROJECTILE PENETRATION, SNOW COVER EFFECT, MILITARY OPERATION, SNOW DEN-SITY, MILITARY ENGINEERING, PROTEC-TION, PENETRATION TESTS, PHOTOGRAPHY. TION, PENETRATION TESTS, PHOTOGRAPHY.

A soldier on the battlefield is told to "dig in" to protect himsel' against projectiles and fragments. But in cold regions or assaons the ground may be hard, suitable only for deliberate field fortifications built using machines and explosives. However, a winter battlefield scenario often contains an excellent protective material: the snow cover. Often neglected or considered a nuisance, snow can be an obstacle and a disadvantage for the ignorant and a decisive advantage for the properly trained and knowledgesble soldier. Construction of a protective structure made of ordinary snow requires an order of magnitude less effort in time, manpower and energy than is required to obtain the same amount of protection by using sand bags or by "digging in." We have found that small arms projectiles penetrate only 2 m into a snowpile and that protection against recoilless rifte ammunition (HEAT) of the shaped charge type requires the energy to penetration depth relations are complex and that projectile penetrate only described that energy to penetration depth relations are complex and that projectile detonating fuzes may present greater difficulties in snow covered terrain.

STUDY OF A GROUNDED FLOEBERG NEAR REINDEER ISLAND, ALASEA.
Kovaca, A., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, July 1977, 9p., Unpublished technical report. 38-4377

GROUNDED ICE, ICE SCORING, ICE FLOES, ICE PILEUP, PRESSURE RIDGES, DRIFT, UNIT-ED STATES—ALASKA—PRUDHOE BAY.

MP 1752 SIMPLE BOOM ASSEMBLY FOR THE SHIP-BOARD DEPLOYMENT OF AIR-SEA INTERAC-TION INSTRUMENTS.

Andreas, E.L., et al. Ocean engineering, 1984, 11(3), p.227-237, For another source see 38-868 or 13G-28929. 21 refs.
Rand, J.H., Ackley, S.F.

MARINE METEOROLOGY, METEOROLOGI-CAL INSTRUMENTS, MEASURING INSTRU-MENTS, BOOMS (EQUIPMENT), SHIPS, AN-TARCTICA

TARCTICA.

We have developed a simple boom for use in measuring meteorological variables from a ship. The main structural member of the boom, a triangular communications tower with rollers attached along its bottom side, is deployed horizontally from a long, flat deck, such as a helicopter deck, and will support a 100-kg payload at its outboard end. The boom is easy to deploy, requires minimal ship modifications, and provides ready access to the instruments mounted on it. And because it is designed for use with the ship crosswind, occanographic work can go on at the same time as the six-sea interaction measurements. We describe our use of the boom on the Mikhall Somov during a cruise into the Antarctic set ice and present some representative measurements made with instruments mounted on it. Theory, experiment, and our data all imply that instruments measurements made with instruments mounted on: I heo-ry, experiment, and our data all imply that instruments deployed windward from a rear helicopter deck can reach air undisturbed by the ship. Such an instrument site has clear advantages over the more customary mast, bow, or buoy locations. (Auth.)

SOIL MICROBIOLOGY. Bosatta, E., et al, Simulation of nitrogen behaviour of soil-plant systems. Edited by M.J. Frissel and J.A. van Veen. Wageningen, the Netherlands, Pudoc, Centre for Documentation, 1981, p.38-44.

Iskandar, I.K., Juma, N.G., Kruh, G., Reuss, J.O., Tanill K.W. Veen. LAW, Veen. 14, 1981.

ji, K.K., Veen, J.A. van. 38-4435

SOIL MICROBIOLOGY, URBA, NUTRIBNT CY-CLE, MATHEMATICAL MODELS.

MP 1754

ATMOSPHERIC CONDITIONS AND CONCUR-RENT SNOW CRYSTAL OBSERVATIONS DUR-ING SNOW-ONE-A.

Bliello, M.A., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Mar. 1983, No.83-04, Snow Symposium 2, Vol.1, p.3-18, ADB-073 046, 14 refa.

O'Brien, H. 38-4305

38-4305 SNOWFALL, SNOW CRYSTAL STRUCTURE, SNOW OPTICS, SYNOPTIC METEOROLOGY, AIR MASSES, AIR TEMPERATURE, HUMIDITY, WEATHER OBSERVATIONS, FALLING BO-

A survey of the synoptic weather patterns and vertical profiles of temperature and humidity over northern Vermont was conducted during periods of snowfall between December 1981 and February 1982. The crystal habit of falling snow, discerned principally from on-site optical microscopy, was also observed during this period. This information was ano observed during this period. This information was used to investigate the association between air mass characteristics and snow crystal types. The ultimate objective of the analysis is to link large-scale weather conditions with the observed physical features of falling frozen particles and with measurements recorded concurrently by electrooptical sensor systems.

MP 1755

NORTHWEST SNOWSTORM OF 15-16 DECEM-

Bates, R.E., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Mar. 1983, No.83-04, Snow Symposium 2, Vol.1, p.19-34, ADB-073 046, 4 refs. 38-4306

SNOWSTORMS, SNOW DEPTH, SNOWFALL, SYNOPTIC METEOROLOGY, METEOROLOGI-CAL DATA.

This paper contains a detailed description of meteorological conditions (including upper air) of an intense Northeast snowstorm that occurred in mid-December 1981. The paper relates the on-site meteorology to the overall concurrent sysoptic situation. Consideration is given to air mass, hydrometeor intensity, visibility and crystal habit along the SNOW-ONE-A primary line-of-site.

FALLING SNOW CHARACTERISTICS AND EX-TINCTION.

Berger, R.H., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Mar. 1983, No.83-04, Snow Symposium 2, Vol.1, p.61-69, ADB-073 046, 2 refs. 38-4309

SNOWFALL, LIGHT TRANSMISSION, PARTICLE SIZE DISTRIBUTION, PRECIPITATION GAGES, LIGHT SCATTERING.

OAUSA, LIUTI SCAT IERING.

An examination of the literature shows that a single relationship between the extinction and the precipitation rate does not exist for snow as it does for rain. This is due in part to the wide range of particle sizes and shapes which determine both the optical and mechanical properties of snow. The extinction measurements and extensive move characterization made during the SNOW-ONE and SNOW-ONEA field experiments provide the dats for an examination of the dependence of the estinction on various snow characteristics. The correlations between the extinction and several snow characterization parameters are presented.

VISIBLE PROPAGATION IN FALLING SNOW AS A FUNCTION OF MASS CONCENTRATION AND CRYSTAL TYPE.

Lacombe, J., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Mar. 1983, No.83-04, Snow Symposium 2, Vol.1, p.103-111, ADB-073 046, 8 refa.

Koh, G., Curcio, J.A. 38-4311

LIGHT TRANSMISSION, ATTENUATION, SNOWPALL, SNOW CRYSTAL STRUCTURE, SNOW OPTICS, OPTICAL PROPERTIES, DENSITY (MASS/VOLUME).
At SNOW_OND_A

At SNOW-ONE-A mass concentration of falling snow was measured in conjunction with measurements of visible transmittance and observations of snow crystal type. An examination of a significant portion of the resulting data base reveals that a general correlation exists between visible attenuation and snow concentration. The data also indicate that crystal habit is a major factor affecting the relationship between attenuation and concentration.

MP 1758 FREE WATER MEASUREMENTS OF A SNOW-

PACK. Fisk, D.J., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Mar. 1983, No.83-04, Snow Symposium 2, Vol.1, p.173-176, ADB-073 046, 2 refs. 38-4317

SNOW WATER CONTENT, TEMPERATURE MEASUREMENT, UNFROZEN WATER CONTENT, SNOW MELTING, CALORIMETERS.

A review is given of methods (metting and freezing calorimetry) previously used for measuring the free water content of snow on the ground. Their merits and faults are described. A new method, developed by the author, based on the temperature depression observed when a snow sample is completely dissolved in ethanol, is described and compared the melting and freezing calorimetric methods

MP 1759 PERFORMANCE AND OPTICAL SIGNATURE OF AN AN/VVS-1 LASER RANGEFINDER IN FALLING SNOW: PRELIMINARY TEST RE-

Lacombe, J., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Mar. 1983, No.83-04, Snow Symposium 2, Vol.1, p.253-266, ADB-073 046, 10 refs.

ADB-0/3 040, 10 reta.
38-4324
SNOW OPTICS, SNOWPALL, LIGHT TRANSMISSION, ELECTROMAGNETIC PROPERTIES,
BLOWING SNOW, PHOTOGRAPHY, LASERS,
SNOWSTORMS, ATTENUATION, MEASURING
INSTRUMENTS, VISIBILITY.

ANALYSI make the large representation was operated.

INSTRUMENTS, VISIBILITY.

An AN/VVS-1 pulsed ruby laser rangefinder was operated during the February 9, 1982 snow storm at SNOW-ONE-A. The device's digital readout was monitored as the system ranged over known distances to several targets. System performance has been evaluated relative to detailed measurements of airborne-snow concentration, precipitation rate and visible transmittance. Observations of the rangefinder's optical signature have been made using a video camera and still photography. This work was accomplished during both clear-air and light-snowfall conditions.

CHEMICAL OBSCURANT TESTS DURING WINTER: ENVIRONMENTAL FATE.

VAINTERS ENVIRONMENTAL FALE.

Cragin, J.H., U.S. Army Cold Regions Research and
Engineering Laboratory. Special report, Mar. 1983,
No.83-04, Snow Symposium 2, Vol.1, p.267-272,
ADB-073 046, 3 refs.

38-4325 SNOW OPTICS, INFRARED RECONNAIS-SANCE, AEROSOLS, CHEMICAL ANALYSIS, POLLUTION, TEMPERATURE EFFECTS, SAM-PLING, TESTS.

rLinu, 12318.

Concentrations of orthophosphate, IR1 and IR2 obscurants were measured in surface snow samples after a wintertime test of white phosphorus (WP) smoke and the two infrared exceeders. Sample concentrations of IR1 and IR2 decreased exponentially downwind from the smoke release point. Orthophosphate concentrations were all less than the analytical detection limit of 0.15 mg/L. Quantities of smoke released pose no hazard to the public or environment. Snow was found to provide a clean non-contamination surface means the same of the contamination surface means the contamination surface means. ound to provide a clean non-contaminating surface upon which to collect the deposited aerosol.

ON SMALL-SCALE HORIZONTAL VARIATIONS OF SALINITY IN FIRST-YEAR SEA ICE. Tucker, W.B., et al. Journal of geophysical research, July 20, 1984, 89(C4), p.6505-6514, 20 refs. Gow, A.J., Richter, J.A. 38-4365
SEA ICE VOL.

SEA ICE, ICE SALINITY, BRINES, VARIATIONS. SEA ICE, ICE SALINITY, BRINES, VARIATIONS. Measurements of salinity over horizontal distances of 38 to 76 cm in a thick first-year ice sheet have revealed significant differences. A maximum salinity difference of 2 per mill was observed between ice core segments from the same depth. The mean standard deviation for 10-cm thickness increments through the 2.0-m ice sheet was 0.39 per mill between the five closely spaced cores. The most likely mechanisms for these significant differences in salinity over short distances is differential brine drainage in the ice sheet due to varying locations of brine drainage channels. A simple one-dimensional model which assumes a normally distributed arrangement of brine drainage channels provides results consistent with the horizontal differences observed. (Auth.) MP 1762 WASTEN: A MODEL FOR NITROGEN BEHAVI-OUR IN SOILS IRRIGATED WITH LIQUID

WASJE...
Selim, H.M., et al, Simulation of nitrogen behaviour of soil-plant systems. Edited by M.J. Frissel and J.A. van Veen, Wageningen, Netherlands, Centre for Agricultural Publication, [1984], p.96-108, 19 refs. lakandar, I.K. 39-234

39-234
WASTE TREATMENT, WATER TREATMENT,
CHEMICAL ANALYSIS, LAND RECLAMATION, WASTE DISPOSAL, IRRIGATION,
MATHEMATICAL MODELS, SOIL WATER,
PORECASTING, COMPUTER APPLICATIONS.

ICE COVER MELTING IN A SHALLOW RIVER. Calkina, D.J., Canadian journal of civil engineering, June 1984, 11(2), p.255-265, With French summary. 9 refe

ICE MELTING, RIVER ICE, ICE JAMS, HEAT TRANSFER, FRAZIL ICE, WATER TEMPERA-TURE, RIVER FLOW, FREEZING POINTS, DI-URNAL VARIATIONS, TEMPERATURE DISTRI-BUTTON.

The heat transfer coefficients computed from field data on both ice cover melting and water temperature attenuation are higher than the values one would compute based on extrapolation of previous laboratory flume data. The com-puted heat transfer coefficients were relatively consistent when calculated from the water temperature decay data. Consistent results were also obtained with one set of very detailed ice cover melting data. The disrupt fluctuation when calculated from the water temperature decay data. Consistent results were also obtained with one set of very detailed ice cover melting data. The diurnal fluctuation in water temperature from the freezing point to values of 0.4-0.6 C was associated with the incoming solar radiation and the open water surface area. The measured water temperature distribution beneath the ice cover at a particular cross section varied from 0.2 to 0.6 C due to the influence of frazil ice and flow distribution. In the open water reaches the water temperature was essentially fully mixed vertically but lateral variation across the river ranged from 0.1 to 0.3 C. The average daily melting of the ice cover often exceeded 5.0 cm and at some locations the rate was as high as 8 cm/d. The melt was not uniform across the section but was highly dependent upon the flow conditions, velocity, and depth. The ice cover melting for this year only occurred during the daylight hours as the air temperature likewise decayed to its freezing point.

SURFACE ROUGHNESS OF ROSS SEA PACK

Govoni, J.W., et al, Antarctic journal of the United States, 1983, 18(5), p.123-124, 5 refs. Ackley, S.F., Holt, E.T.

SEA ICE, PACK ICE, ICE SURFACE, MEASURING INSTRUMENTS, ANTARCTICA—ROSS SEA.

SEA.

At the end of the 1980 austral winter, sea-ice surface roughness was assessed along selected tracks in the Ross Sea. The ice surveyed consisted mainly of first-year pack ice. Surface profiles were made using a Spectra-Physica Geodolite 3A laser profilometer which was mounted vertically in the camera bay of a National Science Foundation LC-130 aircraft. The profilometer, recording equipment and measurement technique are described. For the data analyzed to date, the Ross Sea region appears in general to have much less ridging than either the Weddell Sea or the Arctic Basin. The open nature of the boundaries here leads to generally divergent conditions and diminishes the stress transmitted through the pack ice resulting in fewer high ridges. Near coastal boundaries, however, localized high stress may exist and ridging features develop accordingly.

TWO-DIMENSIONAL MODEL OF COUPLED

TWO-DIMENSIONAL MODEL OF COUPLED HEAT AND MOISTURE TRANSPORT IN FROST-HEAVING SOILS.
Guymon, G.L., et al, Journal of energy resources technology, Sep. 1984, 106(3), p.336-343, 30 refs. Hromadka, T.V., II, Berg, R.L. 39.24

HEAT TRANSFER, MOISTURE TRANSFER, FROST HEAVE, SOIL FREEZING, MODELS.

FROST HEAVE, SOIL FREEZING, MODELS.

The model is based unon well known equations of heat and moisture flow in soils. Numerical solution is by the nodal domain integration method which includes the integrated finite difference and the Galerkin finite element methods. Solution of the phase change process is approximated by an isothermal approach and phenomenological equations are assumed for processes occurring in freezing or thawing zones. The model has been verified against experimental one-dimensional soil thawing tank data as well as two-dimensional soil thawing tank data as well as two-dimensional soil seepage data. The model has been applied to several simple but useful field problems such as roadway embankment freezing and frost heaving. (Auth.)

MP 1766
CREEP MODEL FOR CONSTANT STRESS AND
CONSTANT STRAIN RATE.
Fish, A.M., Engineering Mechanics Division Specialty
Conference, 5th, Laramie, WY, Aug. 1-3, 1984. Proceedings, Vol.2. Edited by A.P. Boresi and K.P.
Chong, New York, American Society of Civil Engineers, 1984, p.1009-1012, 5 refs.
39-110

RHEOLOGY, STRESS STRAIN DIAGRAMS, CREEP, STRESSES, STRAINS, TESTS, THERMO-DYNAMICS

MP 1767

MODEL SIMULATION OF 20 YEARS OF NORTHERN HEMISPHERE SEA-ICE FLUC-TUATIONS.

Walsh, J.E., et al, Annals of glaciology, 1984, Vol.5, p.170-176, 20 refs.
Hibler, W.D., III, Ross, B.
39-193

SEA ICE DISTRIBUTION, ICE CONDITIONS, ICE MODELS, DRIFT, SURFACE TEMPERATURE, WIND FACTORS, PERIODIC VARIATIONS, SNOW COVER EFFECT, ICE COVER THICKNESS, CLIMATIC FACTORS.

THICKNESS, CLIMATIC FACTORS.

A dynamic-thermodynamic sea-ice model (Hibler 1979) is used to simulate northern hemisphere sea ice for a 20-year period, 1961 to 1980. The model is driven by daily atmospheric grids of sea-level pressure (geostrophic wind) and by temperatures derived from the Russian surface temperature data set. Among the modifications to earlier formulations are the inclusion of snow cover and a multilevel icethickness distribution in the thermodynamic computations. The time series of the simulated anomalies show relatively large amounts of ice during the early 1960s and middle 1970s, and relatively amall amounts during the late 1960s and early 1970s. The fluctuations of ice mass, both in the entire domain and in individual regions, are more persistent than are the fluctuations of ice-covered area. The ice dynamics tend to introduce more high-frequency variability into the regional (and total) amounts of ice mass. The simulated annual ice export from the Arctic basin into the East Greenland Sea varies interannually by factors of 3 to 4.

THERMAL EXPANSION OF SALINE ICE. Cox, G.F.N., Journal of glaciology, 1983, 29(103), p.425-432, With French and German summaries.

refs. 39-204

ICE SALINITY, SEA ICE, THERMAL EXPANSION, ANALYSIS (MATHEMATICS), BRINES, TEMPERATURE EFFECTS.

The coefficient of thermal expansion of NaCl ice and natural sea ice is theoretically shown to be equal to the coefficient of thermal expansion of pure ice.

SNOW CONCENTRATION AND EFFECTIVE AIR DENSITY DURING SNOW-FALLS.
Mellor, M., Journal of glaciology, 1983, 29(103), p.505-507, With French and German summaries. 1

39-211

SNOWFALL, ATMOSPHERIC DENSITY, SNOW ACCUMULATION, DISTRIBUTION, VELOCITY.

MP 1770

OBSERVATIONS OF VOLCANIC TREMOR AT MOUNT ST. HELENS VOLCANO.

MOUNT ST. HELENS VOICANO.
Fehler, M., Journal of geophysical research, Apr. 10, 1983, 88(B4), p.3476-3484, Comment by M.G. Ferrick and W.F. St. Lawrence. Ibid., July 10, 1984, 89(B7), p.6349-6350. 37 rest.
Fetrick, M.G., St. Lawrence, W.F.

39-322 VOLCANOES, ELASTIC WAVES, SPECTRA, SEISMOLOGY, WAVE PROPAGATION, SOIL MECHANICS, FLUID DYNAMICS, MOUN-TAINS, THEORIES, UNITED STATES—WASH-INGTON—MOUNT SAINT HELENS.

MP 1771

THERMODYNAMIC MODEL OF CREEP AT CONSTANT STRESS AND CONSTANT STRAIN

Fish, A.M., Cold regions science and technology, July 1984, 9(2), p.143-161, For another source see 38-4470. Refs. p.159-161. 39-339

GROUND MECHANICS, STRESS STRAIN DIA-GRAMS, SOIL CREEP, VISCOUS FLOW, MATH-EMATICAL MODELS, TESTS, LOADS (FORCES).

A thermodynamic model has been developed that describes the entire creep process, including primary, secondary, and tertiary creep, and failure for both constant stress (CS) tests and constant strain rate (CSR) tests, in the form of a unified

constitutive equation and unified failure criteria. Deformation and failure are considered as a single thermoscivated
process in which the dominant role belongs to the change
of entropy. Families of creep curves, obtained from uniaxial
compression CS and CSR tests of frozen soil, respectively
(both presented in dimensionless coordinates), are plotted
as straight lines and are superposed, confirming the unity
of the deformation and failure process and the validity of
the model. A method is developed for determining the
parameters of the model, so that creep deformation and
the stress-strain relationship of ductile materials such as
soils can be predicted based upon information obtained from
either type of test.

MP 1772 METHOD OF DETECTING VOIDS IN RUB-

Tucker, W.B., et al, Cold regions science and technology, July 1984, 9(2), p.183-188, 9 refs.
Rand, J.H., Govoni, J.W.

39-343

PRESSURE RIDGES, ICE JAMS, ICE DETECTION, ICE PILEUP, SURFACE ROUGHNESS, POROSITY.

MP 1773

UNIAXIAL COMPRESSIVE STRENGTH OF FROZEN SILT UNDER CONSTANT DEFORMA-

Zhu, Y., et al, Cold regions science and technology, June 1984, 9(1), p.3-15, 8 refs. Carbee, D.L.

39-327

39-327
PROZEN GROUND STRENGTH, STRESS
STRAIN DIAGRAMS, COMPRESSIVE PROPERTIES, GROUND ICE, ICE CRYSTAL STRUCTURE, TESTS, STRAINS, VELOCITY, SOIL
CREEP, RHEOLOGY, TEMPERATURE VARIATIONS, DENSITY (MASS/VOLUME).

TIONS, DENSITY (MASS/VOLUME).
Uniaxial compressive strength tests were conducted on remolded, asturated Fairbanks frozen silt under various constant machine speeds, temperatures and dry densities. Test results abow that the peak strength of frozen illt is not sensitive to dry density (or water content) at 2 C, especially at relatively high strain rates, but is very sensitive to temperature and applied strain rate. However, the failure strain is not sensitive to temperature and strain rate within a wide range of strain, rate, but is very sensitive to dry density. It has been found that the initial yield strength consistently increases with decreasing dry unit weight. The initial yield strain is almost independent of dry density and temperature, but varies with strain rate. The initial tangent modulus of frozen silt is found to be nearly independent of strain rate, but the 50% strength modulus is closely related to strain rate.

The test results indicate that there is a definite relationship between the two moduli.

MP 1774 FIELD DIELECTRIC MEASUREMENTS OF FROZEN SILT USING VHF PULSES. Arcone, S.A., et al, Cold regions science and technology, June 1984, 9(1), p.29-37, 16 refs. Delaney, A.J.

39-329

39-329
FROZEN GROUND PHYSICS, DIELECTRIC
PROPERTIES, RADIO WAVES, PERMAFROST
PHYSICS, GROUND ICE, TUNNELS, WAVE
PROPAGATION, TRANSMISSION, ICE DIELECTRIC WEDGES, TESTS.

MP 1775

DIELECTRIC MEASUREMENTS OF PROZEN SILT USING TIME DOMAIN REFLECTOME-TPV.

Delaney, A.J., et al, Cold regions science and technology, June 1984, 9(1), p.39-46.
Arcone, S.A.

PROZEN GROUND PHYSICS, DIELECTRIC PROPERTIES, GROUND ICE, REFLECTION, WATER CONTENT, TEMPERATURE EFFECTS, MEASURING INSTRUMENTS.

MP 1776

ELECTROMAGNETIC PROPERTIES OF SEA

Morey, R.M., et al, Cold regions science and technology, June 1984, 9(1), p.53-75, For another version see 38-4472. 27 refs.

Kovacs, A., Cox, G.F.N. 39-332

ICE ELECTRICAL PROPERTIES, SEA ICE, ELECTROMAGNETIC PROPERTIES, ICE SPECTROSCOPY, ICE CRYSTAL STRUCTURE, MICROSTRUCTURE, BRINES, ANALYSIS (MATHEMATICS), DIELECTRIC PROPERTIES.

levestigations of the in situ complex dielectric constant of sea ice were made using time-domain spectroscopy. It was found that (1) for sea ice with a preferred horizontal caxis alignment, the anisotropy or polarizing properties of the ice increased with depth, (2) brine inclusion conductivity increased with decreasing temperature down to about -8

C, at which point the conductivity decreased with decreasing temperature, (3) the DC conductivity of sea ice increased with increasing brine volume, (4) the real part of the complex delectric constant is strongly dependent upon brine volume but less dependent upon the brine inclusion orientation, (5) the imaginary part of the complex delectric constant was strongly dependent upon brine inclusion orientation but much less dependent upon brine inclusion orientation but much less dependent upon brine volume.

MP 1777 ELEMENTAL COMPOSITIONS AND CONCEN-TRATIONS OF MICROSPHERULES IN SNOW AND PACE ICE FROM THE WEDDELL SEA. AND PACK ICE FROM THE WEDDELL SEA. Kumai, M., et al, Antarctic journal of the United States, 1983, 18(3), p.128-131, 7 refs. Ackley, S.F., Clarke, D.B. 39-307 PACK ICE, SNOW CRYSTALS, MICROELE-MENT CONTENT, PARTICLES, ANTARCTICA

-WEDDELL SEA

—WEDDELL SEA.

This paper presents the results of an investigation of microspherules found in snow and pack ice from the Weddell Sea, Antarctica, collected during the U.S.-U.S.S.R. Weddell Polynya Expedition, 1981.

Bemental composition, size, and concentration of microspherules were determined using a scanning electron microscope (SEM) and energy dispersive X-ray analysis (BDXA). Typical textures of microspherules are shown in this report and compared with those found in anow and ice-fog crystals sampled from the Northern Hemisphere. In this study, 23 microspherules were found in the snow sample from the Weddell Sea and 6 from the snow-ice sample. The concentration of microspherules in the snow samples is calculated to be approx 0.001 percent, three orders of magnitude smaller than that of the Northern Hemisphere. This indicates that the concentration of microspherules in the Antarctic may be three orders of magnitude smaller than that Silicon—and titanium-rich microspherules from the Weddell Sea were found in thy and of terrestrial origin.

The iron rich microspherules were tentatively identified to be of extraterestrial origin.

MP 1778 LARGE-SCALE ICE/OCEAN MODEL FOR THE

LARGE-SCALE ICE/OUTAN MODEL FOR THE MARGINAL ICE ZONE. Hibler, W.D., III, et al, U.S. Army Cold Regions Re-search and Engineering Laboratory. Special report, Apr. 1984, No.84-07, MIZEX bulletin. 3. Modeling the marginal ice zone, p.1-7, ADA-145 351, 14 refs. Bryan, K. 39-361

39-361 ICE MECHANICS, ICE WATER INTERFACE, SEA ICE DISTRIBUTION, OCEAN CURRENTS, DRIFT, ICE MODELS, SEASONAL VARIATIONS, WATER TEMPERATURE, SALINITY, WIND FACTORS, VELOCITY.

MP 1779 EAST GREENLAND SEA ICE VARIABILITY IN LARGE-SCALE MODEL SIMULATIONS. Walah, J.E., et al, U.S. Army Cold Regions Research

and Engineering Laboratory. Special report, Apr. 1984, No.84-07, MIZEX bulletin. 3. Modeling the marginal ice zone, p.9-14, ADA-145 351, 11 refs. Hibler, W.D., III.
39-362

TICE MECHANICS, SEA ICE, ICE MODELS, THERMODYNAMICS, ICE CONDITIONS, DRIFT, ICE COVER THICKNESS, WIND FACTORS, GREENLAND SEA.

MP 1780
ON THE DECAY AND RETREAT OF THE ICE COVER IN THE SUMMER MIZ.

Maykut, G.A., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Apr. 1984, No.84-07, MIZEX bulletin. 3. Modeling the marginal ice zone, p.15-22, ADA-145 351, 15 refa.

39-363 39-363
SEA ICE DISTRIBUTION, ICE CONDITIONS, ICE MELTING, SOLAR RADIATION, ICE WATER INTERFACE, THERMODYNAMICS, ICE FLOES, HEAT FLUX, ICE MECHANICS, SEASONAL VARIATION, POLYNYAS.

MP 1781 ON THE ROLE OF ICE INTERACTION IN MARGINAL ICE ZONE DYNAMICS.
Leppiranta, M., et al, U.S. Army Cold Regions Re-

search and Engineering Laboratory. Special report, Apr. 1984, No.84-07, MIZEX bulletin. 3. Modeling the marginal ice zone, p.23-29, ADA-145 351, 7 refs. Hibler, W.D., III.

ICE MECHANICS, ICE WATER INTERFACE, ICE EDGE, ICE COVER THICKNESS, ICE CON-DITIONS, ICE AIR INTERFACE, RHEOLOGY, WIND FACTORS, VISCOSITY, MATHEMATI-CAL MODELS.

MP 1782

ANALYSIS OF LINEAR SEA ICE MODELS

ANALISIS OF LINEAR SEA ICE MODELS WITH AN ICE MARGIN.
Lepptrants, M., U.S. Army Cold Regions Research and Bagineering Laboratory. Special report, Apr. 1984, No.84-07, MIZEX bulletin. 3. Modeling the marginal ice zone, p.31-36, ADA-145 351.
39-365

ICE MODELS, SEA ICE, RHEOLOGY, VISCOSI-TY, ICE EDGE, PACK ICE, ANALYSIS (MATH-EMATICS), LOADS (FORCES).

MP 1783 SOME SIMPLE CONCEPTS ON WIND FORC-ING OVER THE MARGINAL ICE ZONE.

ING OVER THE MARGINAL ICE ZONE.
Tucker, W.B., U.S. Army Cold Regions Research and
Ragineering Laboratory. Special report, Apr. 1984,
No.84-07, MIZEX bulletin. 3. Modeling the marginal ice zone, p.43-48, ADA-145 351, 20 refs.

ICE MECHANICS, ICE EDGE, WIND PRES-SURE, SHEAR PROPERTIES, ICE PACK, WIND DIRECTION, SURFACE ROUGHNESS.

VARIATION OF THE DRAG COEFFICIENT ACROSS THE ANTARCTIC MARGINAL ICE ZONE.

Andreas, E.L., et al, U.S. Army Cold Regions Re-Annue as, B.L., et al, U.S. Army Cold Regimes Re-search and Regimeering Laboratory. Special report, Apr. 1984, No.84-07, MIZEX bulletin. 3. Modeling the marginal ice zone, p.63-71, ADA-145 351, 40 refs. Tucker, W.B., Ackley, S.F. 39-370

ICE CONDITIONS, SEA ICE DISTRIBUTION, ICE EORDITIONS, SEA ICE DISTRIBUTION, ICE EDGE, ATMOSPHERIC CIRCULATION, ICE SURFACE, SURFACE ROUGHNESS, AIR TEMPERATURE, WIND DIRECTION, ICE MODELS, BOUNDARY LAYER, ANTARCTICA—WED-DELL SEA.

DELL SEA.

In Oct. 1981 the U.S.-USSR Weddell Polynya Expedition crossed the Antarctic marginal ice zone (MIZ) near the Greenwich Meridian on the Michail Somov. Five radiosondes, Isunched along a 150-km track starting at the ice edge, showed profound modification of the atmospheric boundary layer (ABL) as increasing surface roughness decelerated the flow. An equation is presented for the dependence of the drag coefficient on ice concentration that should be useful for modeling the surface stress in marginal ice zones. The sounding profiles and meteorological data provided a comprehensive look at how surface roughness and temperature changes in the MIZ can affect the ABL.

MECHANISM FOR FLOE CLUSTERING IN THE MARGINAL ICE ZONE.

Leppäranta, M., et al. U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Apr. 1984, No.84-07, MIZEX bulletin. 3. Modeling the marginal ice zone, p.73-76, ADA-145 351, 3 refs. Hibler, W.D., III. 39-371

ICE FLOES, ICE CONDITIONS, SEA ICE DISTRIBUTION, ICE EDGE, DRIFT, ICE MECHANICS, ICE COVER THICKNESS.

MP 1786

RELATIVE ABUNDANCE OF DIATOMS IN WEDDELL SEA PACK ICE.

Clarke, D.B., et al, Antarctic journal of the United States, 1983, 18(5), p.181-182, 12 refs.

Ackley, S.F. 39-310

ALGAE, PACK ICE, FRAZIL ICE, CRYOBIOLO-GY, ANTARCTICA—WEDDELL SEA.

GY, ANTARCTICA—WEDDELL SEA.

Diatoms were found throughout the length of sea ice cores (average length, 75 cm) taken from the Weddell Sea during the Oct.-Nov. 1981 joint U.S.-U.S.S.R. study. As in previous studies it was found that the pennate forms were dominant. Chaetoceros dichaeta Ehrenberg was the only centric species which was "abundant" in the samples, and it has not previously been reported as abundant. Of the pennate species found in abundance, three have been found in abundance by other authors. These are Nitzachis colsterium (Bhrenberg) W. Smith, Nitzachis cylindrus (Grunow) Hasle, and Nitzachis subcurvats Hasle. Also found to be numerically significant in the samples were Nitzachis prolongatoides Hasle, Nitzachis unidentified Navicula species. The table lists the dominant species in each sample and their relative abundances. Five of these species have not previously been found in abundance retices have not previously been found in abundance retic sea ice. Possible reasons for the variable compositions in samples are discussed.

MP 1787 RESERVOIR BANK EROSION CAUSED BY ICE

Gatto, L.W., Cold regions science and technology, Aug. 1984, 9(3), p.203-214, Refs. p.211-214. 39-397

ICE EROSION, BANKS (WATERWAYS), RESER-VOIRS, ICE CONDITIONS, WATER LEVEL, BOTTOM SEDIMENT, SHORE EROSION.

BOTTOM SEDIMENT, SHORE EROSION.

The purpose of this study was to evaluate the documented and potential importance of ice erosion along reservoir banks. The evaluation is based on a literature review and on inferences drawn from field observations and experience. Very little is known about the amount of reservoir bank erosion caused by ice action, although considerable information exists on occ erosion processes along the shorelines and beaches of oceans, rivers and lakes. The importance of ice-related erosion along a reservoir bank would depend primarily on water level, but ice conditions and bank sediment characteristics would also be important. If the reservoir water level is at bank level, ice could directly erode a bank face. If the water is below the bank, ice would have no direct effect on it. However, ice could indirectly increase bank instability by disrupting and eroding nearshore and beach zones, which could lead to bank erosion.

MP 1788

MP 1788
PRELIMINARY INVESTIGATION OF THERMAL ICE PRESSURES.
Cox, G.F.N., Cold regions science and technology,
Aug. 1984, 9(3), p.221-229, 16 refs.

ICE PRESSURE, ICE THERMAL PROPERTIES, STRESSES, RHEOLOGY, ICE TEMPERATURE, LAKE ICE, MATHEMATICAL MODELS, HYDRAULIC STRUCTURES.

DRAULIC STRUCTURES.

Measured ice stress data are needed to verify and improve thermal ice thrust prediction models used in estimating ice forces on dams, bridge piers, locks and other hydraulic structures. During February and March, 1983, thermal ice pressures were measured in the ice on a small lake in central New Hampahire. Byen though the ice sheet was relatively warm and only exhibited small changes in temperature, stresses up to 200 to 300 kPa were recorded with a newly designed biaxial ice-stress sensor. Ice stresses normal and parallel to the shore of the lake were similar. Given the rate of change of temperature of the ice, ice pressures were calculated for the measurement period using a uniaxial rheological model consisting of a spring and nonlinear dashpot connected in series. Calculated and measured stresses were in good agreement.

MP 1789

DETERMINATION OF YOUNG'S STATIC

MODULUS IN SEA ICE.
Richter-Menge, J.A., Cold regions science and technology, Aug. 1984, 9(3), p.283-286, 3 refs.
39-406
ICE MECHANICS, SEA ICE, STRAINS, LOADS (FORCES), STRESSES, TENSILE PROPERTIES, TESTE

TESTS.

MP 1790

EFFECTS OF MAGNETIC PARTICLES ON THE UNFROZEN WATER CONTENT OF FROZEN OILS DETERMINED BY NUCLEAR MAGNET-IC RESONANCE

Tice, A.R., et al, Soil science, July 1984, 138(1), p.63-73, 14 refs.

Oliphant, J.L. 39-455

UNFROZEN WATER CONTENT, FROZEN GROUND PHYSICS, NUCLEAR MAGNETIC RESONANCE, PARTICLES, MAGNETIC PROPERTIES, GROUND THAWING.

ERTIES, GROUND THAWING.

Small ferromagnetic particles in soils locally change the magnetic field of a nuclear magnetic resonance (NMR) snalyzer. This causes a decrease in the NMR signal intensity when NMR is being used to measure unfrozen water contents in partially frozen soils or total water contents in hawed soils. We mixed Tuto clay, a soil containing no magnetic particles, with various small amounts of pure powdered magnetite, and determined the NMR signal intensity while the samples were both thawed and partially frozen. Then we derived an equation that correlates the thawed sample signal intensity with the weight percent of powdered magnetite added. The unfrozen water content of the partially frozen samples could be determined accurately for samples containing up to 0.2 to 0.3% magnetize. Several methods for demagnetizing soils containing large amounts of magnetic particles were tried, with the most effective found to be stirring a slurry of the soil over a powerful permanent magnet. Accurate unfrozen water contents could be determined for all the partially frozen samples is ome form of demagnetizing procedure was used on those samples containing the most magnetic particles.

MP 1791 ICE DETERIORATION.

Ashton, G.D., Gl.ERL contribution, No.428, Great Lakes Ice Research Workshop, Columbus, OH, Oct. 18-19, 1983. Proceedings. Edited by R.A. Assel, and J.G. Lyon, Ann Arbor, MI, Great Lakes Environ-mental Research Laboratory, Sep. 1984, p.31-38, 10 39-481

ICE DETERIORATION, ICE MELTING, HEAT TRANSFER, ICE COVER STRENGTH, HEAT FLUX, BOUNDARY LAYER, ICE DENSITY, THERMAL CONDUCTIVITY, ICE PHYSICS, AL-BEDO.

MP 1792
WATER SUPPLY AND WASTE DISPOSAL ON PERMANENT SNOWFIELDS.
Reed, S.C., et al., Canadian journal of civil engineering, June 1985, 12(2), p.344-350, With French summary.

10 refs.

Bouzoun, J.R., Tobiasson, W.

39-4025

WATER SUPPLY, WASTE DISPOSAL, SNOW COVER EFFECT, WASTE TREATMENT, WATER CHEMISTRY, EQUIPMENT, ICE MELT-

ING.

The snow and glacial ice on permanent snowfields must serve as both the water source and the receptacle for wastes for any human habitation. In addition, the snow also serves as the support media for any structural foundations and hence the thermal aspects of water supply and waste disposal can be critical. Most activity has occurred on the ice caps of Greenland and Antarctics and has ranged from small transient field parties to large permanent facilities in continuous use for over 25 years. Novel procedures to insure the reliable production of good quality water are described as well as the recommended criteria for water quantity depending on the size and duration of the activity. The various methods of wastewater disposal that have been used at temporary camps and permanent stations are described along with the results from studies that defined the faste of the wastewater following its discharge to the snow. Such definition is important to insure protection of the water supply as well as the thermal integrity of any structural foundation.

MP 1793 COLD FACTS OF ICE JAMS: CASE STUDIES OF

COLD FACTS OF ICE JAMS: CASE STUDIES OF MITIGATION METHODS.
Calkins, D.J., Natural Hazards Research and Applications Information Center special publication, No.11, Association of State Floodplain Managers Conference, 8th, Portland, ME, June 11-14, 1984. Proceedings. Managing high risk flood areas, 1985 and beyond, [1984], p.39-47, 10 refs.
40-4457

ICE JAMS, FLOODS, ICE CONTROL, ICE BREAKUP, ICE BOOMS, IMPACT STRENGTH, WATER LEVEL, ICE CONDITIONS.

MP 1794

POLARIZATION OF SKYLIGHT.

Bohren, C., Weatherwise, Oct. 1984, 37(5), p.261-265. 39-563

LIGHT (VISIBLE RADIATION), POLARIZA-TION (WAVES), CLOUDS (METEOROLOGY), LIGHT SCATTERING, PHOTOGRAPHIC TECH-NIQUES, ELECTROMAGNETIC PROPERTIES, OPTICAL FILTERS.

MP 1795

CONTROLLING RIVER ICE TO ALLEVIATE ICE JAM FLOODING.
Deck, D.S., Conference ron, Water for Resource Development, Coeur d'Alene, Idaho, Aug. 14-17, 1984. Proceedings, 1984, p.524-528, 4 refs. 30.614

ICE JAMS, ICE CONTROL, RIVER ICE, FLOOD-ING, ICE BOOMS, ICE BREAKUP, COUNTER-MEASURES.

This paper addresses the author's involvement at two areas where ice jam flooding has caused severe economic hardship and loss of life. An ice boom has been used to control the formation of river ice at Oil City, Pennsylvania, and a permanent ice control structure will be constructed on Cazenovia Creek in West Seneca, New York, to control the river ice during break-up.

MP 1796

SALMON RIVER ICE JAMS.

Cunningham, L.L., et al, Conference ronj Water for Resource Development, Coeur d'Alene, Idaho, Aug. 14-17, 1984. Proceedings, 1984, p.529-533, 4 refs. Calkins, D.J.

ICE JAMS, RIVER ICE, FLOODING, ICE CONDITIONS, FREEZEUP, ICE COVER THICKNESS, ICE CONTROL, MODELS, UNITED STATES—IDAHO—SALMON RIVER.

A study was undertaken to document the ice conditions leading to the ice jam flooding along the Salmon River in the vicinity of Salmon, Idaho. This short paper documents the ice conditions on the river during the freeze-up period and the simple analytical model used to predict the advance of the ice cover leading edge. Ice cover thickness in excess of 9 ft. 3 m) were measured at cross sections where shoving had occurred. The initiation of the ice cover for this resch of the river begins in a long, deep poof formed by an alluvisi fan from Dump Creek that developed in the late 1800's. By improving the flow conveyance through the alluvial fan and increasing the flow velocity in the backwater behind it, the initiation of the freeze-up ice cover could be delayed, thereby delaying the arrived the leading edge at Salmon, Idaho, and reducing the potential for ice jam flooding.

MP 1797 MODELING INTAKE PEFORMANCE UNDER FRAZIL ICE CONDITIONS.

Dean, A.M., Jr., Conference con; Water for Resource Development, Coeur d'Alene, Idaho, Aug. 14-17, 1984. Proceedings, 1984, p.559-563, 5 refs. 39-616

WATER INTAKES, FRAZIL ICE, ICE CONDI-TIONS, WATER PIPES, ICING, MODELS, COUN-TERMEASURES.

TERMRASURES.

A water intake was modeled in a refrigerated flume in an active frazil icing environment in order to evaluate alternative modifications to the prototype structure. Conduit dimensions tested were 2.7-in. round, 4.6-in. round, 6-in. aquare, nan 12-in. square. Entrance shapes tested were square, quarter-rounded, and elliptical. Model flows varied from 50 gpm to 360 gpm, resulting in average model intake velocities of 0.8 fps to 2.8 fps. Corresponding Proude prototype velocities varied from 0.3 fps to 2.0 fps. The length scale varied from 1.6.5 to 1:16. Tests were run until a head was developed across the model intake which was equivalent to a 12-foot head on the prototype, or until the icing tendency of the structure was determined. The icing mechanism observed in the model included stoppering of the intake with ce masses, restriction of the intake with multiparticle masses, and gradual accumulation of frazil ice particles on the intake.

ICE JAMS IN SHALLOW RIVERS WITH FLOODPLAIN FLOW: DISCUSSION.

Beltaos, S., Canadian journal of civil engineering, June 1984, 11(2), p.370-371, 3 refs. Reply by Calkins p.372. For paper being discussed see 38-776, MP 1644.

38-4402 ICE JAMS, RIVER ICE, ICE COVER THICKNESS, RIVER FLOW, FLOODS.

MP 1799 SNOWPACK ESTIMATION IN THE ST. JOHN RIVER BASIN.

Prover, J.M., et al. International Symposium on Remote Sensing of Environment, 14th, San Jose, Costa Rica, Apr. 23-30, 1980. Proceedings, 1980, 467-486, 11 refs.

Merry, C.J., Trivett, N.B.A., Waterman, S.E.

39-601

39-801 SNOW COVER DISTRIBUTION, SNOW WATER EQUIVALENT, RIVER BASINS, REMOTE SENS-ING, SNOWMELT, VEGETATION FACTORS, LANDSAT, ACCURACY, COMPUTER APPLICA-TIONS, MODELS, MAPPING.

TIONS, MODELS, MAPPING.

Two methods for computing basin areal average water equivalent of the enowpack based on point snow course measurements are discussed. One involves the use of a square grid databank of elevations and vegetation types which are regressed against snow water equivalent. The other method utilizes digital tapes of LANDSAT satellite imagery to delineate various vegetation categories throughout a basin. Snow-course values obtained within a given vegetation category are then distributed over the area within each basin which contains that category of vegetation. Where possible, the methods were checked by deriving snowpack values for six basins in the Upper Saint John River basin for the spring of 1978. These values were then used as input to the SSARR model, and the resulting runoff hydrographs were compared to those obtained using the conventional "isoline mapping" method of distributing the snowcourse values. Lastly, a range of errors were introduced into the conventionally derived snowpack values, and the resulting range in errors of the runoff hydrographs were computed to determine the sensitivity of the SSARR model to errors in snowpack input. MP 1800

MP 1800
COMMENTS ON "THEORY OF METAMOR-PHISM OF DRY SNOW" BY S.C. COLBECK.
Sommerfeld, R.A., Journal of geophysical research,
June 20, 1984, 81(7), p.4963-4965, Includes reply by
S.C. Colbeck. 9 refs. For the original article see 37-3571.

Colbeck, S.C. 39-763

METAMORPHISM (SNOW), SNOW CRYSTAL GROWTH, ICE CRYSTAL GROWTH, TEMPERATURE GRADIENTS, VAPOR DIFFUSION, ANALYSIS (MATHEMATICS).

SNOW LOADS ON STRUCTURES.

O'Rourke, M.J., Conference on Applied Techniques for Cold Environments, Anchorage, Alaska, May 17-19, 1978. Proceedings, Vol.1, New York, American Society of Civil Engineers, 1978, p.418-428, 15 refs. 32-3629

SNOW LOADS, ROOFS, WIND VELOCITY.

APPLICATION OF THE ANDRADE EQUATION TO CREEP DATA FOR ICE AND FROZEN SOIL. Ting, J.M., et al, Cold regions science and technology, June 1979, 1(1), p.29-36, 10 refs. Martin, R.T.

33-4238

ICE STRENGTH, FROZEN GROUND MECHAN-ICS, STRAINS, CREEP.

MP 1803
VOLUMETRIC CONSTITUTIVE LAW FOR
SNOW BASED ON A NECK GROWTH MODEL.
Brown, R.L., Journal of applied physics, Jan. 1980,
51(1), p.161-165, 10 refa.
34-2388
SNOW MECHANICS, SNOW DEFORMATION,
SNOW CRYSTAL STRUCTURE, MODELS.

MP 1804 TUSSOCK REPLACEMENT AS A MEANS OF STABILIZING FIRE BREAKS IN TUNDRA VEGETATION.

Patterson, W.A., III, et al, Arctic, June 1981, 34(2), p.188-189, 7 refs. Dennis, J.G.

FIRES, COUNTERMEASURES, ION, VEGETATION, THER-TUNDRA REVEGETATION, MOKARST.

MP 1805 CREEP BEHAVIOR OF FROZEN SILT UNDER CONSTANT UNIAXIAL STRESS.

Zhu, Y., et al, International Conference on Permafrost, 4th, Fairbanks, Alasks, July 17-22, 1983. Proceed-ings, Washington, D.C., National Academy Press, 1983, p. 1507-1512, 10 refs.

Carbee, D.L. 38-1373

FROZEN GROUND STRENGTH, PROZEN GROUND MECHANICS, SOIL CREEP, COM-PRESSIVE PROPERTIES, STRESS STRAIN DIA-GRAMS, RHEOLOGY, TIME FACTOR.

MP 1806
MOBILIZATION, MOVEMENT AND DEPOSITION OF ACTIVE SUBAERIAL SEDIMENT
FLOWS, MATANUSKA GLACTER, ALASKA.
Lawson, D.E., Journal of geology, May 1982, 90(3), p.279-300, 50 refs.
39-765

39-765
SEDIMENT TRANSPORT, GLACIAL DEPOSITS,
GLACIER ABLATION, GLACIER MELTING,
GLACIAL GEOLOGY, GLACIER SURFACES,
MELTWATER, UNITED STATES—ALASKA—
MATANUSKA GLACIER.

MELTWATER, UNITED STATES—ALASKA—MATANUSKA GLACIER.

Subaerial sediment flow is the predominant process depositing diamictons at the terminus of Matanuaka Glacier. Flows originate where sediments overlie glacier ice. Ablation of ice exposed in slopes disaggregates the overlying sediment and mixes it with meltwater and debris released simultaneously. This material generally flows only after its strength is further reduced by excess pore pressures and seepage pressures generated by meltwater from thawing ice. Moving sediment flows show reasonably systematic changes in physical attributes such as dimensions, texture, flow rates, density and erosional action, and in grain support and transport mechanisms that can be related to changes in the water contents of their matrix material. At lowest water contents, flows support grains by their strength and move through shear in a thin zone at their base. Increased thicknesses of the zone in shear and deformation of other types accompany increased water contents, with grain interference and collisions, localized liquefaction and fluidization, transient turbulence, and bediend traction and saltation operating simultaneously in such moving flows. At highest water contents, flows appear fully liquefied. The fluidity of the sediment flow and the amount of water in the sediment flow channel determine the degree of preservation of the source flow's properties and the depositional morphology. Because mobilization of a sediment flow destroys the glacial sedimentary properties of its sediment flow destroys the dismitute of the mechanics of transport and deposition develop new "non-glacial" properties in this sediment, the dismitute of the desiment flow should not be called till.

CREEP BEHAVIOR OF FROZEN SILT UNDER CONSTANT UNIAXIAL STRESS.

Mar. 1984, 6(1), p.33-48, In Chinese with English summary. 13 refs. For another source see 38-1373 summary. (MP 1805)

Carbee, D.L. 39-932

SOIL CREEP, FROZEN GROUND MECHANICS, RHEOLOGY, STRESSES, FROZEN GROUND STRENGTH, COMPRESSIVE PROPERTIES, FROZEN GROUND TEMPERATURE, GRAIN SIZE, TESTS, TEMPERATURE EFFECTS.

SILE, IESIS, IBMPERATURE EPPECIS.

A series of unconfined compression crept tests was conducted on anturated frozen Fairbanks silt at constant-atress and constant-temperature conditions. The authors suggest that the creep of frozen soil be classified into two types: short-term and long-term creep. Different constitutive and strength-lose equations are presented for each type of creep. On the basis of Assur's creep model (1980) and this criterion, a creep equation was derived that can describe the entire process of creep of frozen soil.

MECHANICAL PROPERTIES OF SEA ICE: A STATUS REPORT.

DIAIUS REPURI.
Weeks, W.F., et al, Ocean science and engineering, 1984, 9(2), p.135-198, Refs. p.191-198.
Cox, G.F.N.
39-971

ICE STRENGTH, ICE MECHANICS, DRIFT, SEA ICE, ICE CRYSTAL STRUCTURE, RHEOLOGY, COMPRESSIVE PROPERTIES, ICE SALINITY, PRESSURE RIDGES, ICE LOADS, ICE CONDITIONS, OFFSHORE STRUCTURES.

ICE SEGREGATION AND FROST HEAVING. National Research Council. Ad Hoc Study Group on Ice Segregation and Frost Heaving, Washington, D.C., National Academy Press, 1984, 72p., Refs. p.37-72. 39-1042

FROST HEAVE, GROUND ICE, ICE LENSES, ICE FORMATION, COLD WEATHER CONSTRUCTION, SEASONAL FREEZE THAW, UNFROZEN WATER CONTENT, PHASE TRANSFORMATIONS, HEAT TRANSFER, MODELS.

TERTIARY CREEP MODEL FOR FROZEN SANDS (DISCUSSION).
Fish, A.M., et al. Journal of geotechnical engineering, Sep. 1984, 110(9), p.1373-1378, 7 refs. For paper being discussed see 37-3969. Assur. A.

FROZEN GROUND MECHANICS, SOIL CREEP, SANDS, STRAINS, MATHEMATICAL MODELS.

MIZEX 83 MESOSCALE SEA ICE DYNAMICS:

MIZER 85 MESUSCALE SEA ICE DYNAMICS: INITIAL ANALYSIS. Hibler, W.D., III, et al, U.S. Army Cold Regions Re-search and Engineering Laboratory. Special report, Sep. 1984, SR 84-28, p.19-28, ADA-148 255, 3 refs. Leppuranta, M. 39-1126

ICE MECHANICS, SEA ICE, STRAINS, ICE CON-DITIONS, ICE DEFORMATION, ICE FLOES, ICE EDGE

MP 1812
ON THE RHEOLOGY OF A BROKEN ICE
FIELD DUE TO FLOE COLLISION.
Shen, H., et al, U.S. Army Cold Regions Research and
Engineering Laboratory. Special report, Sep. 1984,
SR 84-28, p.29-34, ADA-148 255, 6 refs.
Hibler, W.D., III, LeppBranta, M.
39-1127

ICE MECHANICS, RHEOLOGY, ICE FLOES, INTERFACES, STRESSES, ICE CREEP, ICE EDGE, MATHEMATICAL MODELS, VELOCITY.

ICE JAM RESEARCH NEEDS. Gerard, R., Workshop on Hydraulics of River Ice, 3rd, Prederiction, New Brunswick, Canada, June 20-21, 1984. Proceedings. Compiled by K.S. Davar and B.C. Burrell, Prederiction, University of New Brunswick, (1984), p.181-193, With French summary. Discussion p.192-193.

Discussion 39-1463

ICE JAMS, FREEZEUP, ICE BREAKUP, ICE FOR-MATION, RIVER ICE, FRAZIL ICE, MODELS, CANADA—NORTHWEST TERRITORIES— MACKENZIE RIVER.

Suggestions developed by the NRCC Working Group on Ice Jams for high priority research needs for ice jams are

given. The suggestions concern ice jam formation, develop-ment and failure at freeze-up and break-up. Related pro-cesses such as frazil formation, hanging dams and ice deteriora-tion were excluded from consideration. It is concluded tion were excluded from consideration. It is concluded that, despite significant progress in the pest two decades, the work of developing a real understanding of ice jam fundamentals has really only just begun.

MP 1814 COMPUTER SIMULATION OF ICE COVER FORMATION IN THE UPPER ST. LAWRENCE

RIVER.
Shen, H.T., et al, Workshop on Hydraulics of River Ice, 3rd, Fredericton, New Brunswick, Canada, June 20-21, 1984. Proceedings. Compiled by K.S. Davar and B.C. Burrell, Fredericton, University of New Brunswick, [1984], p.227-245, With French summary.. Discussion p.245. 23 refs.

Yapa, P.D.
39-1466

39-1400 ICE FORMATION, ICE COVER THICKNESS, RIVER ICE, RIVER FLOW, HEAT TRANSFER, ICE JAMS, HYDRAULICS, COMPUTERIZED SIMULATION, ANALYSIS (MATHEMATICS), CANADA—SAINT LAWRENCE RIVER.

A computer model was developed for simulating the formation of ice cover in the Upper St. Lawrence River. The model included submodels for the river flow condition, the distribution included submodels for the river flow condition, the distribution of water temperature or frazil ice production, and the formation of an ice cover. Distributions of water temperature or ice production are determined by a Lagrangian solution of the equation for the transport of thermal energy subject to surface heat exchange. The formation of an ice cover and ice accumulations is formulated according to existing equilibrium ice jam theories. The hydraulic condition in the river system is determined by an implicit numerical solution of unsteady continuity and momentum equations.

AED 1618. MP 1815

NUMERICAL SIMULATION OF FREEZE-UP ON THE OTTAUQUECHEE RIVER.

Calkins, D.J., Workshop on Hydraulics of River Ice, 3rd, Fredericton, New Brunswick, Canada, June 20-21, 1984. Proceedings. Compiled by K.S. Davar and B.C. Burrell, Fredericton, University of New Brunswick, [1984], p.247-277, With French summary., Discussion p.275-277. 18 refs. 39-1467

FREEZEUP, RIVER ICE, RIVER FLOW, METEOROLOGICAL FACTORS, HYDRAULICS, ICE MECHANICS, MATHEMATICAL MODELS, WATER LEVEL, ICE EDGE, ICE COVER THICK-NESS, ICE JAMS, HEAT TRANSFER, UNITED STATES-VERMONT-OTTAUOUECHEE RIV-

A numerical model of the flow and ice conditions during freeze-up for the Ottauquechee River has been developed and calibrated with reasonable success. A limited sensitivity analysis of the key ice hydraulic modeling coefficients and independent variables was undertaken to examine their effect on the rate of leading edge progression, ice thicknesses and water levels. The criteris for advancement of the leading edge were based on both the entrainment velocity of incoming frazil slush at the leading edge and whether or not the flow condition was sub-critical just upstream of the leading edge. The depositional mode of ice thickness in the steep reaches and over 80% in 1 km of the pool. The simulation suggests that the initial ice cover thickness during progression can be predicted using the equilibrium ice jam theory with a suitable cohesion coefficient. The inflow ice discharge and ice generated within the reach modeled were important and have to be known with reasonable accuracy to get good simulations of the ice thicknesses, water levels and ice cover progression.

MP 1816 RISE PATTERN AND VELOCITY OF FRAZIL ICE.

Wuebben, J.L., Workshop on Hydraulics of River Ice, 3.L., Workshop on riyaratics of River Ice, 3rd, Fredericton, New Brunswick, Canada, June 20-21, 1984. Proceedings. Compiled by K.S. Davar and B.C. Burrell, Fredericton, University of New Brunswick, [1984], p.297-316, With French summary, Discussion p.315-316. 3 refs.

FRAZIL ICE, RIVER ICE, ICE MECHANICS, VELOCITY, TESTS, ARTIFICIAL ICE.

VELOCITY, TESTS, ARTIFICIAL ICE.

The objective of this study was to examine the rise pattern and velocity of frazii ice. In addition, discs made of other materials were employed both to facilitate this study and to aid in the development of artificial frazii for future transport studies. The rise velocity is a parameter important to the understanding of frazii entrainment, transport and deposition. Laboratory tests were conducted in a large clear plastic cylinder at controlled temperatures. The rise velocity of real frazii is compared with theory and given an indirect verification that the preferential crystal growth direction increases disc diameter while the thickness remains essentially constant. The effective drag coefficients and rise pattern stability are discussed in terms of a Reynolds-Strouhal number relationship. The results from real and artificial frazii experiments are compared, and criteria for frazii simulation are suggested.

RADAR MEASUREMENTS OF BOREHOLE GEOMETRY ON THE GREENLAND AND AN-TARCTIC ICE SHEETS.

Jezek, K.C., Geophysics, Feb. 1985, 50(2), p.24 251,

GLACIER FLOW, RADAR ECHOES, BORE-HOLES, ICE SHEETS, ICE MECHANICS, GLACIER OSCILLATION, GREENLAND, ANTARC-TICA—DOME C.

A method for measuring the geometry of boreholes in glaciers has been developed and tested in Greenland and Antarctica. Coordinates of points along the borehole are determined by lowering a passive radar target into the borehole and then tracking the target from three surface stations. Comparison of geometry interpreted from radar data and from a conventional inclinometry experiment indicates that radar data can be used to estimate average borehole inclination and azimuth but cannot be used to measure details of the and azimuth but cannot be used to measure details of the borehole geometry that are revealed by conventional inclinometry surveys. Random error introduced by variations in the physical properties of the glacier and electrical noise in the radar unit limit measurement accuracy, but the accuracy can be improved by establishing additional surface radar stations around the borehole. These experiments demonstrate the utility of the radar method and suggest the possibility of deploying permanently installed radar targets in ice sheets to measure intraglacial movements. (Auth.)

MP 1818

WEST ANTARCTIC SEA ICE. Ackley, S.F., Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.88-95, PB85-110 757, 14 refs. 39-1502

SEA ICE, ICE COVER EFFECT, CLIMATIC CHANGES, CARBON DIOXIDE, HEAT TRANS-FER, ANTARCTICA—AMUNDSEN SEA, AN-TARCTICA—ROSS SEA.

In constructing models for predicting antarctic sea ice effect on global climate, temperature and wind fields over and below the pack ice must be analyzed. These elements affect the maximum extent of the ice pack and the ice dynamics in the pack strongly modulates the CO2-induced temperature rises. These factors are discussed in text and discrepants.

MP 1819 TRANSPORT OF WATER IN FROZEN SOIL: 5. ***IRANSPORT OF WATER IN FROZEN SOIL: 5, METHOD FOR MEASURING THE VAPOR DIFFUSIVITY WHEN ICE IS ABSENT.
Nakano, Y., et al, Advances in water resources, Dec. 1984, Vol.7, p.172-179, 12 refs.
Tice, A.R., Jenkins, T.F.
39-1719
FROZEN COLUMN

FROZEN GROUND, SOIL WATER MIGRATION, WATER TRANSPORT, VAPOR DIFFUSION, EX-PERIMENTATION.

A new experimental method is introduced for determining the relative magnitudes of liquid and vapor diffusion by using a small amount of soluble chemical as a tracer. The theoretical justification of the method is presented for the case where ice is absent. The feasibility of the method is demonstrated by an experiment using marine-deposited

MP 1920

ONG-TERM EFFECTS OF OFF-ROAD VEHI-

CLE TRAFFIC ON TUNDRA TERRAIN.
Abele, G., et al, Journal of terramechanics, 1984, 21(3), p.283-294, 10 refs. Brown, J., Brewer, M.C.

39-1360 AIR CUSHION VEHICLES, TRACKED VEHI-CLES, TUNDRA, DAMAGE, ACTIVE LAYER, VEGETATION, PERMAFROST, ENVIRONMEN-TAL IMPACT, THAW DEPTH, TESTS.

TAL IMPACT, THAW DEPTH, TESTS.

Traffic tests were conducted at two sites in northern Alaska with an air cushion vehicle, two light tracked vehicles, and three types of wheeled Rolligon vehicles. The traffic impact (surface depression, effect on thaw depth, damage to vegetation, traffic signature visibility) was monitored for periods of up to 10 years. Data show the immediate and long-term effects from the various types of vehicles for up to 50 traffic passes and the rates of recovery of the active layer. The air cushion vehicle produced the least impact. Multiple passes with the Rolligons caused longer-lasting damage than the light tracked vehicles because of their higher ground contact pressure and wider area of disturbance. Recovery occurs even if the initial depression of the tundra surface by a track or a wheel is quite deep (15 cm), as long as the organic mat is not sheared or destroyed.

MP 1821

DISCUSSION: ELECTROMAGNETIC PROP-ERTIES OF SEA ICE BY R.M. MOREY, A. KOVACS AND G.F.N. COX.

Arcone, S.A., Cold regions science and technology, Nov. 1984, 10(1), p.93-94, For paper being discussed see 39-332 (MP 1776). 1 ref. 39-1626

ICE ELECTRICAL PROPERTIES, ELECTRO-MAGNETIC PROPERTIES, SEA ICE, ICE RELAXATION.

MP 1822

AUTHORS' RESPONSE TO DISCUSSION ON: ELECTROMAGNETIC PROPERTIES OF SEA

Morey, R.M., et al, Cold regions science and technology, Nov. 1984, 10(1), p.95-97, For original paper see 39-332 (MP 1776); for discussion by S.A. Arcone, see 39-1626 (MP 1821). 1 ref. Kovacs, A., Cox, G.F.N. 39-1627

ICE ELECTRICAL PROPERTIES, ELECTRO-MAGNETIC PROPERTIES, SEA ICE, ICE RELAXATION, ELECTRICAL RESISTIVITY.

MP 1823
PROBABILITY MODELS FOR ANNUAL EXTREME WATER-EQUIVALENT GROUND

Ellingwood, B., et al, Monthly weather review, June 1984, 112(6), p.1153-1159, 12 refs.
Redfield, R.K.

39-1740

SNOW WATER EQUIVALENT, SNOW LOADS, ROOFS, STATISTICAL ANALYSIS, DESIGN.

ROOFS, STATISTICAL ANALYSIS, DESIGN.
A statistical analysis of annual extreme water-equivalents of ground snow (reported as inches of water) measured up through the winter of 1979-80 at 76 weather stations in the northeast quadrant of the United States is presented. The analysis suggests that probability distributions with longer upper tails than the Type I distribution of extreme values are preferable for describing the annual extremes at a majority of sites. Sampling errors and the selection of water-equivalents for planning and design purposes also are described. MP 1824

MP 1824
ICE FLOW LEADING TO THE DEEP CORE
HOLE AT DYE 3, GREENLAND.
Whillans, I.M., et al, Annals of glaciology, 1984, Vol.5,
p.185-190, 12 refa.
Jezek, K.C., Drew, A.R., Gundestrup, N.

39-196 ICE MECHANICS, RHEOLOGY, BOREHOLES, ICE BOTTOM SURFACE, RADIO BCHO SOUNDINGS, ICE COVER THICKNESS, VELOCITY, GREENLAND.

MP 1825
LABORATORY INVESTIGATION OF THE KINETIC PRICTION COEFFICIENT OF ICE.
Forland, K.A., et al, IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984.
Proceedings, Vol.1, [1984], p.19-28, 11 refa.
Tatinclaux, J.C.
39.1752 39-1752

ICE FRICTION, ICE LOADS, ICE MECHANICS, ICE HARDNESS, ICE SOLID INTERFACE, SUR-FACE ROUGHNESS, EXPERIMENTATION, TEMPERATURE EFFECTS, SHEAR STRESS.

TEMPERATURE EFFECTS, SHEAR STRESS.

In the growing field of ice engineering there is a need o establish standardized model tests of structures for use in environments. This study was designed to investigate the relative influence of various parameters on the kinetic friction coefficient between ice and different surfaces and determine which of those variables would need future, incepth investigation. Friction tests were performed with urea-doped, columnar ice, and the parameters of normal pressure, velocity, type of material, material roughness, ice hardness and test configuration were studied. Tests were conducted by pulling a loaded sample of ice over a sheet of material and by pulling a loaded sample of material over an ice sheet. An ambient temperature of -1.5C was maintained throughout the testing process, and the ice surface hardness was measured using a specially designed apparatus. The experimental results of the friction tests revealed that the behavior of the friction coefficient with varying velocity was significantly influenced by the test configuration and material roughness. Its magnitude was also affected by varying normal pressure, ice hardness, surface roughness and type of material.

MP 1826

MP 1826

FLEXURAL STRENGTHS OF FRESHWATER

Gow, A.J., IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.1, [1984], p.73-82, 4 refs. 39-1757

ICE STRENGTH, FLEXURAL STRENGTH, LAKE ICE, ICE CRYSTAL STRUCTURE, ICE TEMPERATURE, GRAIN SIZE, TESTS.

In this paper we present results of small beam tests performed on simulated lake ice corresponding in structure to the two major ice types, S1 and S2, encountered in lake ice covers. In these tests a combination of cantilever and simply supported beams was used to ascertain the dependence of flexural strength of the ice on its structure and temperature. It was found that macrocrystalline (S1) ice and columnar (S2) ice exhibit significant differences in bending strength and that substantial stress concentrations exist at the fixed corners of cantilever beams. Differences in response of S1 and S2 ice to bending forces clearly reflect variations in grain size, crystal orientation, temperature, and temperature gradient in the simulated ice, and these factors must be carefully considered when interpreting results of tests of the flexural strength of natural ice covers.

MP 1827 ICEBREAKING BY GAS BLASTING.

Mellor, M., IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol. 1, [1984], p. 93-102, 6 refs. 39-1759

ICE BLASTING, ICE BREAKING, HIGH PRES-SURE TESTS, ICE COVER THICKNESS, GASES, TESTS, ICE LOADS, HYDRAULIC STRUC-TURBS, EQUIPMENT.

TURES, EQUIPMENT.

Icobreaking tests utilizing high pressure air and CO(2), low pressure air, and fuel/oxidant combustion are reviewed and the results are interpreted. Applying cube root energy scaling to test discharges of approximately 1 MJ, it appears that fracture craters up to about 5.8 m/MIJ(1/3) in diameter can be formed by optimum underwater blasts. Practical systems for clearing or displacing ice could be based on air guns developed for offshore sciamic work, with gun pressure in the range 17-20 MPs and single-gun energy up to about 11 MJ. A procedure for making preliminary design calculations and safety appraisals is outlined, and it is concluded that a working "Super-Bubbler" need not be very complex or expensive.

QUIET FREEZING OF LAKES AND THE CON-CEPT OF ORIENTATION TEXTURES IN LAKE

Gow, A.J., IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol. 1, 1984, p.137-149, 6 refs. 39-1763

Ings, vol.1, [1704], p.17-179, v. total.
39-1763

LAKE ICE, ICE CRYSTAL STRUCTURE, ICE NUCLEI, FREEZING, TURBULENCE, TESTS.
Several years' observations of the crystaline structure of
ice sheets forming on a number of New England lakes
indicate that just two major types of congelation ice are
formed during quiet (non-turbulent) freezing of lake water.
These are: (1) ice sheets characterized by the growth of
massive prismatic crystals exhibiting vertical or near-vertical
c-axes probably equivalent to so-called SI ice and (2) ice
sheets composed predominantly of vertically elongated crystals
exhibiting horizontally oriented c-axes, so-called columnar
ice or S2 ice. In this context of quiet freezing of lakes
it was also determined that columnar textures are always
associated with horizontal c-axis orientations of the crystals,
whereas the development of c-axis vertical orientation is
invariably linked with the growth of massive crystals. These
observations have fostered the concept of orientation textures.

DYNAMICS OF FRAZIL ICE FORMATION.

Daly, S.P., et al, IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.1, [1984], p.161-172, 10 refs. Stolzenbach, K.D.

FRAZIL ICE, ICE CRYSTAL GROWTH, HEAT TRANSFER, MATHEMATICAL MODELS, MASS TRANSFER, SURFACE PROPERTIES, ICE CRYS-

TAL NUCLEI.

This paper applies quantitative approaches of large-scale industrial crystallization to the study of frazii ice. The development of a crystal number continuity equation and a heat conservation equation can serve as a basis for predicting size distribution and concentration of frazii crystals. The key parameters in these equations are the crystal growth rate and the rate of secondary nucleation. The crystal growth rate is determined by the heat transfer rate from the crystals to the fluid, the intrinsic kinetics of the crystals surface tension and the mass transfer rate of secondary nucleation. the crystals to the fluid, the intrinsic kinetics of the crystals, surface tension, and the mass transfer rates. Available data indicate that the growth of the major axis of frazil crystals is controlled largely by heat transfer. The heat transfer supersection of disks suspended in turbulent flow is presented. The rate of secondary nucleation can be expressed as the product of three functions, which relate the energy transferred to crystals by collision. The secondary nucleation rate is found to be a function of the turbulent energy dissipation and a strongly nonlinear function of the form and magnitude of the crystal size distribution. The number continuity and heat conservation equations are troublesome to solve simultaneously because they are nonlinear and dimensionally incompatible. However, the equations can be used in the development of models of frazil ice formation.

MP 1830

FIELD INVESTIGATION OF ST. LAWRENCE RIVER HANGING ICE DAMS.
Shen, H.T., et al, IAHR International Symposium on

Sice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.1, (1984), p.241-249, 12 refs. Van DeValk, W.A.

39-1772

ICE DAMS, RIVER ICE, ICE SURVEYS, RIVER FLOW, CHANNELS (WATERWAYS), BOTTOM TOPOGRAPHY, CANADA—SAINT LAWRENCE

A field survey of a hanging ice dam in the St. Lawrence River is reported. Cross section profiles of the dam, the channel geometry, and velocity profiles underneath the dam were measured. Formation processes of hanging dams are discussed and supported by field observations.

MP 1831

METHODS OF ICE CONTROL FOR WINTER NAVIGATION IN INLAND WATERS.
Frankenstein, G.E., et al, IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.1, [1984], p.329-337, 11

Wortley, C.A. 39-1780

ICE NAVIGATION, ICE CONTROL, RIVER ICE, PORTS, WINTER MAINTENANCE, ICE BREAKING, THERMAL EFFECTS, ICE REMOVAL, ICE BOOMS.

BOOMS.
Successful methods of controlling ice in rivers and harbors where winter navigation is maintained are described. These methods are developed from field and laboratory research studies and from operating experiences. The control of ice is schieved through layout and design of harbor facilities, management of traffic operations, and by using chemical, electrical, mechanical, and thermal methods including ice breaking, channel and flow modifications, air bubbling, warm water discharges, resistance heating, coatings, and control structures. The control methods used must be evaluated in terms of reliability, safety, energy consumption, and environmental impact for costs and effectiveness for both docks and harbors. Thermal methods and mechanical methods are most favored by these criteria. most favored by these criteria.

ICE SHEET RETENTION STRUCTURES.
Perham, R.E., IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.1, [1984], p.339-348, 20 refs.
39-1781

ICE CONTROL, STRUCTURES, ICE SHEETS, ICE BOOMS, ICE FORMATION, ICE COVER, COUNTERMEASURES, WATER FLOW.

TERMEASURES, WATER FLOW.

Ice sheets are formed and retained in several ways in nature, and an understanding of these factors is needed before most ice sheet retention structures (not and are somewhat flexible; others are fixed and rigid or semingid. An example of the former is the Lake Erie boom and of the latter, the Montreal ice control structure. Ice sheet retention technology is changing. The use of timber cribe is gradually but not totally giving way to sheet steel pillings and concrete cells. New structures and applications are being tried, but with caution. Ice-hydraulic analyses are helpful in predicting the effects of structures and channel modifications no ice cover formation and retention. Often, varying on ice cover formation and retention. Often, varying the flow rate in a particular system at the proper time will make the difference between whether a structure will or will not retain ice. The structure, however, invariably adds reliability to the sheet ice retention process.

MAY 1833 ANALYSIS OF RAPIDLY VARYING FLOW IN ICE-COVERED RIVERS. Perrick, M.G., IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Pro-ceedings, Vol.1, [1984], p.359-368, 6 refs. 39,1783 39-1783

RIVER FLOW, RIVER ICE, ICE COVER EFFECT, ICE BREAKUP, WATER WAVES, FRICTION, EXPERIMENTATION, ICE JAMS, ICEBOUND RIV-ERS

ERS.
Rapidly varying flow waves are a primary cause of ice cover breakup on rivers.

and the difficulties involved in determining conditions in the field, analyses of river waves during breakup are subject to much uncertainty. We conducted laboratory experiments to determine the effects of the ice cover upon these waves, and to identify the physical processes that produce these effects. The dimensionless friction scaling parameter of the St. Venant equations provides a quantitative estimate of the friction/inertia balance that dictates river wave behavior. Knowledge of this balance is essential to interpretation and analysis of flow wave data. In this paper we apply the friction parameter in our interpretation of the laboratory data and address discrepancies between data and previous analyses of an ice jam release on the Athabasca River.

MP 1834

CRUSHING ICE FORCES ON CYLINDRICAL

STRUCTURES.

Morria, C.E., et al. IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.2, [1984], p.1-9, 19 refs. Sodhi, D.S.

30-1787

ICE PRESSURE, STRUCTURES, ICE SOLID IN-TERFACE, COMPRESSIVE PROPERTIES, ICE COVER THICKNESS, PILES, ICE LOADS, ICE STRENGTH, VELOCITY, EXPERIMENTATION. The parameters varied during the experimental program were structure diameter and velocity. Maximum ice forces were normalized by the product of structure diameter, ice thickness and unconfined compressive strength of the ice. The results show that ice force, depend significantly on aspect ratio and velocity-to-thickness ratio, and that variations in velocity-to-structure-diameter ratio does not influence the maximum normalized forces. normalized forces.

MP 1835

CRYSTALLINE STRUCTURE OF UREA ICE SHEETS USED IN MODELING IN THE CRREL TEST BASIN.

Gow, A.J., IAHR International Symposium on Ice, 7h, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.2, [1984], p.241-253, 13 refs. 39-1807

ICE CRYSTAL STRUCTURE, UREA, CIAL ICE, MICROSTRUCTURE, ICE MODELS, SEA ICE, ICE STRENGTH, ICE SHEETS, TESTS. Standard petrographic techniques were used for studying microstructure in thin sections of urea ice sheets now being used extensively in the CRREL Test Basin for modeling sea ice. Depending mainly on the seeding techniques employed and partly on the thermal condition in the column of urea-doped water two kinds of ice with radically different structural and mechanical properties have been identified. In the one exhibiting vertical c-axis structure minimal urea is incorporated into the ice crystals, and ice sheets with this kind of structure tend to remain "strong" even after the temperature of the ice is raised close to its melting point. Ice of the second type is characterized by a preponderance of crystals exhibiting horizontal c-axes. This kind of ice, which is only produced when the test basin is seeded prior to freezing, also contains abundant inclusions of urea systematically incorporated into the crystals; the overall columns retructure of this ice closely resembles that of ordinary sea ice and optimum test conditions for modeling purposes are usually obtained with warm isothermal ice sheets of the latter type. SEA ICE, ICE STRENGTH, ICE SHEETS, TESTS. are usually

MP 1836

EVALUATION OF A BLAXIAL ICE STRESS

Cox, G.F.N., IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.2. (1984), p.349-361. ings, Vol 39-1816

ICE LOADS, STRESSES, MEASURING INSTRU-

ICE LOADS, STRESSES, MEASURING INSTRU-MENTS, TESTS.

Controlled laboratory tests were performed to evaluate the response of a cylindrical, biaxial ice stress seasor. The tests demonstrate that the sensor has a low temperature sensitivity and is not significantly affected by differential termal expansion between the ice and gauge. Loading tests on fresh water and saline ice blocks containing the embedded sensor show that the sensor has a resolution of 20 kPa and an a "uracy of better than 15% under a variety of uniaxial and biaxial loading conditions.

MP 1837 STRUCTURE OF FIRST-YEAR PRESSURE RIDGE SAILS IN THE PRUDHOE BAY RE-

Tucker, W.B., et al, Alaskan Beaufort Sea: ecosystems and environments. Edited by P.W. Barnes, D.M. Schell and E. Reimnitz, Orlando, FL, Academic Press, 1984, p. 115-135, 25 refs. Sodhi, D.S., Govoni, J.W.

39.1873

PRESSURE RIDGES, ICE STRUCTURE, SEA ICE, ICE COVER THICKNESS, ICE SHEETS, MOD-BLS, ICE PILEUP, UNITED STATES—ALASKA— PRUDHOE BAY.

MP 1838 SOME PROBABILISTIC ASPECTS OF ICE GOUGING ON THE ALASKAN SHELF OF THE BEAUFORT SEA.

Weeks, W.F., et al, Alaskan Beaufort Sea: ecosystems and environments. Edited by P.W. Barnes, D.M. Schell and E. Reimnitz, Orlando, FL, Academic Press, 1984, p.213-236, 23 refs. Barnes, P.W., Rearic, D.M., Reimnitz, E.

39-1877

ICE SCORING, PRESSURE RIDGES, BOTTOM TOPOGRAPHY, OCEAN BOTTOM, STATISTI-CAL ANALYSIS, OFFSHORE STRUCTURES, DE-SIGN, BOTTOM SEDIMENT, PIPELINES, BEAU-FORT SEA

MP 1839

DETERMINING DISTRIBUTION PATTERNS OF ICE-BONDED PERMAPROST IN THE U.S.

BEAUFORT SEA FROM SEISMIC DATA.
Neave, K.G., et al, Alaskan Beaufort Sea: ecosystems
and environments. Edited by P.W. Barnes, D.M.
Schell and E. Reimnitz, Orlando, FL, Academic Press, 1984, p.237-258, 24 refs. Seilmann, P.V.

39-1878
SUBSEA PERMAFROST, SEISMIC VELOCITY, PERMAFROST DISTRIBUTION, EXPLORATION, CRUDE OIL, SEISMIC REFRACTION, VELOCITY, TEMPERATURE DISTRIBUTION, DETECTION, BEAUFORT SEA.

MP 1840
USE OF SIMILARITY SOLUTIONS FOR THE PROBLEM OF A WETTING FRONT—A QUESTION OF UNIQUE REPRESENTATION.

1. A STATE OF THE PROBLEM OF 1982,

Nakano, Y., Advances in water resources, Sep. 1982, Vol.5, p.156-166, 30 refs. 39-1937

SEEPAGE, WATER, POROUS MATERIALS, SOIL PHYSICS, SOIL WATER MIGRATION, FLOW RATE, ANALYSIS (MATHEMATICS).

The use of similarity solutions for the problem of horizontal infiltration of water into a semi-infinite, dry and homogeneous portions medium is studied based upon some recent results of functional analysis. It is found that the so-called non-unique representation of reported experimental moisture profiles for this problem is not necessarily evidence against the validity of the extended Darcy's law for unsaturated flow through persons media flow through porous media.

TRANSPORT OF WATER IN FROZEN SOIL: 3. EXPERIMENTS ON THE EFFECTS OF ICE

Nakano, Y., et al, Advances in water resources, Mar.1984, Vol.7, p.28-34, 5 refs. Tice, A.R., Oliphant, J.L. 39-1945

39-1945
WATER TRANSPORT, FROZEN GROUND,
GROUND ICE, SOIL WATER MIGRATION,
WATER VAPOR, WATER CONTENT, EXPERIMENTATION.

FERIMENTATION.

Effects of ice content on the transport of water in frozen soil are studied experimentally and theoretically under isothermal conditions. A physical law, that the flux of water in unsaturated frozen soil is proportional to the gradient of total water content, is proposed. Theoretical justification is made by the use of the two-phase flow theory. The experimental results are shown to support the proposed physical law. The results of this study are presented in two parts. The experimental aspects of the study are presented in this paper and the second paper contains the theoretical aspects of the study.

ROLE OF HEAT AND WATER TRANSPORT IN FROST HEAVING OF FINE-GRAINED PUR-OUS MEDIA UNDER NEGLIGIBLE OVERBUR-DEN PRESSURE.

DEN PRESSURE.
Nakano, Y., et al, Advances in water resources, June 1984, Vol.7, p.93-102, 18 refs.
Horiguchi, K.
39-1936
FROST HEAVE, HEAT TRANSFER, WATER TRANSPORT, SOIL WATER MIGRATION, POROUS MATERIALS, WATER INTAKES, GRAIN SIZE EINES SIZE, FINES.

SIZE, FINES.

An equation accurately describing the rate of frost heave is derived by using the mixture theory of continuum mechanics. It is shown that the rate of frost heave is determined mainly by the rate of heat removal and the rate of water intake. When the phase equilibrium holds in the system, the relation between the rate of heat removal and the rate of water intake is shown to depend mainly on the phase composition data of a given medium. By studying reported experimental data, it is found that the phase equilibrium may hold until the rate of heat removal reaches a certain critical value. When the rate of heat removal exceeds this critical value, the phase equilibrium may possibly be disrupted for some media.

TRANSPORT OF WATER IN FROZEN SOIL: 4.
ANALYSIS OF EXPERIMENTAL RESULTS ON THE EFFECTS OF ICE CONTENT.

Nakano, Y., et al, Advances in water resources, June 1984, Vol.7, p.58-66, 19 refs.
Tice, A.R., Oliphant, J.L.

Tice, A. 39-1946

WATER TRANSPORT, FROZEN GROUND, GROUND ICE, SOIL WATER MIGRATION, DIFFUSION, ANALYSIS (MATHEMATICS).

Effects of ice content on the transport of water in frozen soil are studied experimentally and theoretically under isothermal conditions. A physical law, that the flux of water in unsaturated frozen soil is proportional to the gradient

of total water content is proposed. Theoretical justification is made by the use of the two-phase flow theory. The experimental results are shown to support the proposed physical law. The results of this study are presented in two parts and this is the second paper describing the theoretical aspects of the study

MP 1844

RHEOLOGY OF GLACIER ICE.

Jezek, K.C., et al, Science, Mar. 15, 1985, 227(4692), p.1335-1337, 13 refs.

Alley, R.B., Thomas, R.H. 39-1942

GLACIER ICE, RHEOLOGY, ICE SHELVES, STRAINS, ICE MECHANICS, ANTARCTICA--ROSS ICE SHELF.

ROSS ICE STIELT.

A new method for calculating the stress field in bounded ice shelves is used to compute strain rate and deviatoric stress on the Ross Ice Shelf, Antarctica. The analysis shows that strain rate (per second) increases as the third power of deviatoric stress (in newtons per square meter), with a constant of proportionality equal to 2.3 x 10 to the -25th power. (Auth.)

MP 1845 SITE-SPECIFIC AND SYNOPTIC METEOROLOGY.

Bates, R.E., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1983, SR 83-16, SNOW-ONE-B data report, p.13-80, ADB-088 224. 39-1952

SYNOPTIC METEOROLOGY, SNOWFALL, METEOROLOGICAL DATA, SNOW COVER, SNOW CRYSTAL STRUCTURE, WIND VELOCI-TY. AIR MASSES, STATISTICAL ANALYSIS

MP 1846 ATMOSPHERIC TURBULENCE MEASURE-

MENTS AT SNOW-ONE-B.
Andreas, E.L., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1983, SR 83-16, SNOW-ONE-B data report, p.81-87, ADB-088 224.

39-1953 35-1933 ATMOSPHERIC CIRCULATION, SNOWFALL, SPECTRA, REFRACTION, TURBULENCE, ELECTROMAGNETIC PROPERTIES, MEASUR-ING INSTRUMENTS.

MP 1847

SNOW CHARACTERIZATION AT SNOW-ONE-

Berger, R.H., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1983, SR 83-16, SNOW-ONE-B data report, p.155-195, ADB-088 224, 2 refs. Fisk, D., Koh, G., Lacombe, J.

39-1933 ICE CRYSTAL STRUCTURE, SNOW CRYSTAL STRUCTURE, SNOW CRYSTAL GROWTH, SNOW COVER DISTRIBUTION, PARTICLE SIZE DISTRIBUTION, SNOWFALL, TEMPERATURE EFFECTS, HUMIDITY, STATISTICAL ANAL-

SUMMARY OF THE STRENGTH AND MODU-LUS OF ICE SAMPLES FROM MULTI-YEAR PRESSURE RIDGES.

Cox, G.F.N., et al, Journal of energy resources technology, Mar. 1985, 107(1), p.93-98, 14 refs. For another source see 38-2035.

Richter, J.A., Weeks, W.F., Mellor, M. 39-2082

PRESSURE RIDGES, ICE STRENGTH, COM-PRESSIVE PROPERTIES, STRAINS, TEMPERA-TURE EFFECTS, POROSITY, TESTS.

TURE BFFECTS, POROSITY, TESTS.

Over two hundred unconfined compression tests were performed on vertical ice samples obtained from 10 multiyear pressure ridges in the Beauford Sea. The tests were
performed on a closed-loop electrohydraulic testing machine
at two strain rates 1/100,000 and 1/1,000/s and two temperatures (-20 and -5C). This paper summarizes the sample
preparation and testing techniques used in the investigation
and presents data on the compressive strength and initial
tangent modulus of the ice.

MP 1849

PRELIMINARY EXAMINATION OF THE EF-FECT OF STRUCTURE ON THE COMPRESSIVE STRENGTH OF ICE SAMPLES FROM MULTI-YEAR PRESSURE RIDGES.

RICHET, J.A., et al., Journal of energy resources technology, Mar. 1985, 107(1), p.99-102, 9 refs. For another source see 38-2037 (MP 1685). Cox. G.F.N. 39-2083

PRESSURE RIDGES, ICE CRYSTAL STRUC-TURE, ICE STRENGTH, COMPRESSIVE PROP-ERTIES, STRAINS, SEA ICE, TEMPERATURE EFFECTS, POROSITY, TESTS.

A series of 222 uniaxial constant-strain-rate compression tests was performed on vertical multi-year pressure ridge sea ice samples. A preliminary analysis of the effect of structure on the compressive atrength of the ice was performed on 78 of these tests. Test parameters included a temperature of -5C (23F) and strain rates of 1/100,000 and 1/1,000/s. Columnar ice loaded parallel to the elongated crystal axes and perpendicular to the crystal c-axis was consistently the strongest type of ice. The strength of the elongated crystals approached the plane of maximum shear. Samples containing granular ice or a mixture of granular and columnar ice resulted in intermediate and low strength values. No clear relationship could be established between structure and strength for these ice types. However, in general, their strength decreased with an increase in porosity.

MP 1850 DESIGN AND PERFORMANCE OF WATER-RE-TAINING EMBANEMENTS IN PERMAPROST. Sayles, F.H., International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Final proceedings, Washington, D.C., National Academy Press, 1984, p.31-42, Refs. p.40-42. 39-2124

39-2149
PERMAFROST BENEATH STRUCTURES,
WATER RETENTION, DAMS, GROUND THAWING, FREEZE THAW CYCLES, EMBANKMENTS, MAINTENANCE, DESIGN, PERMAFROST THERMAL PROPERTIES, ARTIFICIAL
FREEZING, SOIL FREEZING, COLD WEATHER
CONSTRUCTION. CONSTRUCTION

CONSTRUCTION.

To date, the water-retaining structures constructed and maintained on permatrost in North America have been designed and built using a combination of soil mechanics principles for unfrozen soils and unproven permafrost theory. In the USSR, at least five sizeable hydroelectric and water supply embankment dams as well as several small water supply embankment dams have been constructed and maintained on permafrost. The larger dams are understood to have performed well, but the smaller dams have been a mix of successes and failures. Specific criteria are still lacking for design, operation, and post-construction monitoring of water-retaining embankments founded on permafrost. The purpose of this presentation is to review the current practice, point out how it is deficient, and note what major problems need attention.

MP 1851 STATUS OF NUMERICAL MODELS FOR HEAT AND MASS TRANSFER IN FROST-SUSCEPTIBLE SOILS.

Berg, R.L., International Conference on Permafrost, 4th, Fairbanka, Alaska, July 17-22, 1983. Final pro-ceedings, Washington, D.C., National Academy Press, 1984, p.67-71, Refs. p.69-71. 39-2130

39-2130
PERMAFROST THERMAL PROPERTIES,
FROST RESISTANCE, HEAT TRANSFER, MASS
TRANSFER, THERMAL CONDUCTIVITY,
FROST HEAVE, MATHEMATICAL MODELS,
HYDRAULICS, LATENT HEAT, MOISTURE
TRANSFER, BOUNDARY LAYER.

MP 1852 SUBSEA PERMAPROST DISTRIBUTION ON

THE ALASKAN SHELF.
Sellmann, P.V., et al. International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983.
Final proceedings, Washington, D.C., National Academy Press, 1984, p.75-82, 30 refs. Hopkins, D.M. 39-2131

SUBSEA PERMAFROST, PERMAFROST DISTRIBUTION, PERMAFROST THERMAL PROPERTIES, PERMAFROST DEPTH, OCEAN BOTTOM, WATER TEMPERATURE, SHORES, SEISMIC SURVEYS, BOTTOM SEDIMENT, CHUKCHI SEA, BEAUFORT SEA.

MP 1853 LABORATORY TESTS AND ANALYSIS OF THERMOSYPHONS WITH INCLINED EVAPORATOR SECTIONS.

EVAPORATUR SECTIONS.

Zarling, J.P., et al, International Offshore Mechanics and Arctic Engineering Symposium, 4th, Dallas, Texas, Feb. 17-21, 1985. Proceedings, Vol.2, New York, American Society of Mechanical Engineers, 1985, p.31-37, 16 refs. Haynes, F.D. 39-2392

39-2392
SUBGRADE SOILS, COOLING, EVAPORATION,
HEAT TRANSFER, THERMAL CONDUCTIVITY, WIND TUNNELS, WIND VELOCITY, AIR
TEMPERATURE, FOUNDATIONS, GRAVEL,
ANALYSIS (MATHEMATICS).

Subgrade cooling methods in cold regions include the use of thermosyphons with inclined evaporator sections. This laboratory study was conducted to determine the thermal performance characteristics of a thermosyphon. Evaporator inclination angles ranged from 0 to 12 deg from the horizontal. A standard full size thermosyphon, charged with carbon

dioxide, was tested in CRREL's atmospheric wind tunnel. Empirical expressions are presented for heat removal rates as a function of wind speed and ambient air temperature for each of the inclined evaporator angles. An approximate analytical method is also presented for foundation thermal design using thermosphons under buildings with a slab-on-grade foundation. Heat gains from the alab to the thermosphon as well as the evaporator temperature are presented as functions of time.

MP 1854

FREEZING OF SOIL WITH PHASE CHANGE OCCURRING OVER A FINITE TEMPERATURE

Lunardini, V.J., International Offshore Mechanics and Arctic Engineering Symposium, 4th, Dallas, Texas, Feb. 17-21, 1985. Proceedings, Vol.2, New York, American Society of Mechanical Engineers, 1985, p.38-46, 10 refs. 39-2393

39-2393
SOIL FREEZING, PHASE TRANSFORMATIONS, TEMPERATURE DISTRIBUTION, ANALYSIS (MATHEMATICS), FREEZE THAW CYCLES, UNFROZEN WATER CONTENT, THERMAL CONDUCTIVITY.
While many materials undergo phase change at a fixed temperature, soil systems exhibit a definite zone of phase change. The variation of unfrozen water with temperature causes the soil to freeze or thaw over a finite temperature range. Exact and approximate solutions are given for conduction phase change of plane layers of soil with water contents that vary linearly, quadratically, and exponentially with temperature. The temperature and phase change depths are found to vary significantly from those of the constant temperature or Neumann problem.

MP 1855

DETERMINING THE CHARACTERISTIC LENGTH OF FLOATING ICE SHEETS BY MOV-ING LOADS.

Sodhi, D.S., et al, International Offshore Mechanics and Arctic Engineering Symposium, 4th, Dallas, Texas, Feb. 17-21, 1985. Proceedings, Vol.2, New York, American Society of Mechanical Engineers, 1985, p.155-159, 6 refs.
Martinson, C.R., Tucker, W.B. 39-2408

THICKNESS, DYNAMIC LOADS, ICE DEFORMATION, VELOCITY, TESTS.

MATION, VELOCITY, TESTS.

To determine the characteristic length of a floating ice sheet, the deflection of the ice sheet must be measured in response to a known load. Deflection measurements with a deflectioneter require reference to a fixed datum. A simple deflection measuring technique is described here that is based on integration of the response of a sensitive slope transducer to a moving load at constant speed. This procedure does not require reference to a fixed datum; instead the gravitational field acts as the datum. The characteristic lengths obtained from the slope-integration method compare very favorably with those obtained from direct measurement of deflections.

MP 1856

TENSILE STRENGTH OF MULTI-YEAR PRES-SURE RIDGE SEA ICE SAMPLES.

Cox, G.F.N., et al, International Offshore Mechanics Cox, C.F.N., et al, International Orisinore weenamics and Arctic Engineering Symposium, 4th, Dallas, Texas, Feb. 17-21, 1985. Proceedings, Vol.2, New York, American Society of Mechanical Engineers, 1985, p.186-193, 20 refs. Richter-Menge, J.A. 30, 2417

39-2412

PRESSURE RIDGES, ICE STRENGTH, TENSILE PROPERTIES, SEA ICE, STRESS STRAIN DIA-GRAMS, TESTS.

GRAMS, TESTS. Thirty-six constant strain-rate uniaxial tension tests were performed on vertically oriented multi-year preasure ridge samples from the Beaufort Sea. The tests were performed on a closed-loop electro-hydraulic testing machine at two strain rates (1/100000 and 1/1000/s) and two temperatures (-20 and -5C). This paper summarizes the sample preparation and testing techniques used in the investigation and presents data on the tensile strength, initial tangent modulus, and failure strain of the ice.

MP 1857

MP 1857
STRUCTURE, SALINITY AND DENSITY OF
MULTI-YEAR SEA ICE PRESSURE RIDGES.
Richter-Menge, J.A., et al, International Offshore Mechanics and Arctic Engineering Symposium, 4th, Dallas, Texas, Feb. 17-21, 1985. Proceedings, Vol.2,
New York, American Society of Mechanical Engineers, 1985, p.194-198, 11 refs.
Cox, G.F.N.
39-2413
PRESSURE RIDGES. ICE STRUCTURE. ICE

PRESSURE RIDGES, ICE STRUCTURE, ICE SALINITY, ICE DENSITY, SEA ICE, ICE LOADS, PROFILES, BEAUFORT SEA.

Data are presented on the variation of ice structure, salinity and density in multi-year pressure ridges from the Beaufor Sea. Two continuous multi-year pressure ridge cores are examined as well as ice sample data from numerous other

pressure ridges. The results suggest that the large scale properties of multi-year pressure ridges are not isotropic, and that the use of anisotropic ridge models may result in lower design ridge ice loads.

MP 1858

10.2416

GRAIN SIZE AND THE COMPRESSIVE STRENGTH OF ICE.

Cole, D.M., International Offshore Mechanics and Arctic Engineering Symposium, 4th, Dallas, Texas, Feb. 17-21, 1985. Proceedings, Vol.2, New York, American Society of Mechanical Engineers, 1985, p.220-226, 15 refs.

ICE STRENGTH, COMPRESSIVE PROPERTIES, GRAIN SIZE, STRESS STRAIN DIAGRAMS,

This work presents the results of uniaxial compression tests on freshwater polycrystalline ice. Grain size of the test material ranged from 1.5 to 5 mm, strain rate ranged from 1/1,000,000 to 1/100/s and the temperature was -5 C. The grain size effect emerged clearly as the strain rate increased to 1/100,000/s and persisted to the highest applied strain rates. On average, the stated increase in grain size brought about a decrease in peak stress of approximately 31%. The occurrence of the grain size effect coincided with the onset of visible cracking. The strength of the material increased to a maximum at a strain rate of 1/1,000/s, and then dropped somewhat as the strain rate increased further to 1/100/s. Strain at peak stress generally tended to decrease with both increasing seven decrease. 1/100/s. Strain at peak stress generally tended to decrease with both increasing grain size and increasing strain rate. The results are discussed in terms of the deformational mechanisms which lead to the observed behavior.

MP 1859

IN-ICE CALIBRATION TESTS FOR AN ELON-GATED, UNIAXIAL BRASS ICE STRESS SEN-SOR.

Johnson, J.B., International Offshore Mechanics and Arctic Engineering Symposium, 4th, Dallas, Texas, Feb. 17-21, 1985. Proceedings, Vol.2, New York, American Society of Mechanical Engineers, 1985, p.244-249, 8 refs. 39-2420

39-2420
ICE LOADS, STRESS' S, MEASURING INSTRUMENTS, LOADS (FON-CES), DESIGN, TESTS.
An elongated, uniaxial brass ice stress sensor has been developed by the University of Alaska and used in several field
experiments. Laboratory calibration tests have been conducted, in a 60 x 29.5 x 8.5 in, 1524 x 750 x 216 mm)
ice block into which the sensor was frozen, to determine
the sensor's response characteristics. Test results indicate
that the sensor acts as a stress concentration with a stress
concentration factor of 2.4 and transverse sensitivity of 1.3 at stresses below 30 lbf/sq in (207 kPs). At stresses
greater than 30 lbf/sq in the stress concentration factor
increased and the sensor exhibited a time delay response
to load. Differences of 22% were measured between the
measured sensor stress immediately after a constant ice load
was applied and the symptotic stress limit. Interpretation
of measured sensor stresses can be considered reliable at
ambient ice stress levels below 30 lbf/sq in.

MP 1860

MP 1860 CALIBRATING CYLINDRICAL HOT-FILM ANEMOMETER SENSORS.

Andreas, E.L., et al. Journal of atmospheric and oceanic technology, June 1986, 3(2), p.283-298, Refs. p.298. Murphy, B. 40-4484

ANEMOMETERS.

ANEMOMETERS.

We report the results of 82 separate calibrations of cylindrical, platinum hot-film anemometer sensors in air. The calibrations for each sensor involved a determination of its temperature-resistance characteristics, a study of its heat transfer in forced convection, and an investigation of its yaw response. The convective heat transfer relation that we derive predicts the Nusselt number of the sensor as a linear function of e.g. 0.40, where R is the Reynolds number based on sensor diameter (1<R<43). For the 53 micrometer diameter ere sensors that we used, this heat transfer relation applies to wind speeds typical of the atmospheric surface layer, 1 to 20 m/s. From the heat transfer relation we also devise a usehod for determining hor-film operating characteristics at temperatures other than the calibration temperature. Hinze's relation is the best model for the yaw response of these sensors, being valid over virtually the entire range of yaw angles, 0 to 90 deg. Although the yaw parameter is so weak in the atmospheric surface layer that k can be assumed constant at 0.3.

MP 1861

TECHNIQUE FOR OBSERVING FREEZING FRONTS.

Colbeck, S.C., Soil science, Jan. 1985, 139(1), p.13-20, 8 refs.

39-2563
ICE WATER INTERFACE, PREEZING, ICE FOR-MATION, SOIL FREEZING, ICE LENSES, TESTS.

On the basis of observations of freezing fronts and liquid inclusions in liquid-saturated glass beads, a simple technique is described for making these direct observations. The ice-water interface at the freezing front was concave when

viewed from the ice side, because the glass beada were preferentially wetted by the liquid. The size and number of liquid inclusions decreased with distance behind the freezing front. More liquid is trapped by smaller glass beads. The liquid inclusions are probably enriched in soluble impurities. No tendency for pressure buildup or ice lense formation was observed, perhaps because large particles were used. It is very important to extend these observations to other conditions. conditions, especially to smaller particle sizes. MP 1862

GRAIN GROWTH AND THE CREEP BEHAV-IOR OF ICE.

Cole, D.M., Cold regions science and technology, Feb. 1985, 10(2), p.187-189, 4 refs. 39-2560

ICE CREEP, ICE CRACKS, ICE FORMATION, GRAIN SIZE, RHEOLOGY, ICE GROWTH, STRAINS, TESTS.

MP 1863

THERMAL (2-5.6 MICRON) EMITTANCE OF DIATHERMANOUS MATERIALS AS A FUNC-TION OF OPTICAL DEPTH, CRITICAL ANGLE AND TEMPERATURE.

Munis, R.H., et al, Society of Photo-Optical In-strumentation Engineers. Proceedings, Vol.510. In-frared technology X, Bellingham, WA, 1984, p.209-220, 11 refs. Marshall, S.J.

MATSHAIL, 5.J.
39-2842
TEMPERATURE MEASUREMENT, MATERIALS, INFRARED PHOTOGRAPHY, THERMAL RADIATION, OPTICAL PROPERTIES, SPECTRA, REFLECTIVITY, TEMPERATURE EFFECTS, MATHEMATICAL MODELS.

FECTS, MATHEMATICAL MODELS.
Thermal measurements of the normal emittance of several disthermanous materials were made at 15.2 C, 4.9 C and -5.6 C. Calculations of the total bemispherical emittance were made from normal emittance and plotted against the optical depth. A comparison of these data with a model proposed by Gardon indicates that at near-ambient temperatures they agree very closely. It has been observed that normal emittance is greater than hemispherical emittance by approx. 5% for both weakly and strongly absorbing materials. This is attributable to phase differences in the multiply reflected internal radiation attempting to exit the specimen throughout steradians. Other radiation properties of the materials, i.e. diffuse transmittance, absorption coefficient, and absorption index were calculated.

MMP 1864

MP 1864

ATTENUATION AND BACESCATTER FOR SNOW AND SLEET AT 96, 140, AND 225 GHZ. Nemarich, J., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-35, Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984. Proceedings, Vol.1, p.41-52, Aug. 14-16, 1984. Proceedings, Vol.1, p.41-52, ADB-090 935, 3 refs. Wellman, R.J., Gordon, B.E., Hutchins, D.R., Turner,

G.A. , Lacombe, J.

ATTENUATION, SNOWFLAKES, BACKSCAT-TERING, ICE CRYSTALS, WAVE PROPAGA-TION, SNOWFALL, RAIN, TRANSMISSION, METEOROLOGICAL FACTORS.

METEOROLOGICAL FACTORS.

Measurements are reported for attenuation and backacatter at 96, 140, and 225 GHz for falling snow and for mixed anow, sleet, and rain. The measurements were made with the Harry Diamond Laboratories Near-Millimeter Wave Mobile Measurement Facility at the SNOW-TWO Test at Grayling, MI, during the winter of 1983-1984. The dependence of the attenuation and backacatter levels on frequency, snow mass concentration, and ground-level air temperature are discussed. Measurements dade at 96 GHz with various combinations of transmitter and receiver polarizations showed no polarization-related effects on the attenuation or backacatter levels.

APD 1966

MP 1865
CATALOG OF SMOKE/OBSCURANT CHARACTERIZATION INSTRUMENTS.

TO A Regions Re-

O'Brien, H.W., et al, U.S. Army Cold Regions Re-Search and Engineering Laboratory. Special report, Dec. 1984, SR 84-35, Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984. Proceedings, Vol. 1, p.77-82, ADB-090 935. Bowen, S.L.

39-2950

WAVE PROPAGATION, TRANSMISSION, AIR POLLUTION, ELECTRICAL MEASUREMENT, ATTENUATION, OPTICAL PROPERTIES, SNOWFLAKES, AEROSOLS, DUST, MEASURING INSTRUMENTS, RADIOMETRY, BACK-SCATTERING.

The requirement for improved quantification of obscuration parameters is generally recognized by those who attempt to measure, evaluate or predict electro-optical system performance during periods of adverse transmission conditions. A broad spectrum of measurement devices, ranging from simple to extremely sophisticated, are presently in use for making obscurant measurements. To minimize duptication of effort and to help disseminate information on the current status of instrumentation, the Project Manager for Smoke/Obscurants tasked the U.S. Army Cold Regions Research and Engineering Laboratory with initiating a catalog of instrumentation currently used by government agencies and their contractors to

MP 1866 PERFORMANCE OF MICROPROCESSOR-CONTROLLED SNOW CRYSTAL REPLICATOR. Koh, G., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-35, Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984. Proceedings, Vol.1, p.107-111, ADB-090 035 A refe 935. 4 refs.

SNOW CRYSTAL STRUCTURE, SNOWFALL, TRANSMISSION, ELECTROMAGNETIC PROP-ERTIES, SNOWFLAKES, ICE CRYSTAL REPLI-CAS, ARTIFICIAL SNOW.

CAS, ARTIFICIAL SNOW.

Changes is now crystal characteristics during snowstorms are frequently observed. A continuous record of these changes is required to study the effect of airborne snow on the transmission properties of electromagnetic energy. A continuous snow crystal replicator suitable for this task has been developed and was field-tested at the SNOW II exercise. This replicator, which employs a Fornwar technique for snow crystal replication developed by Schaefer (1956) possesses electronic and mechanical features previously unavailable in other replicators and represents a significant improvement in Fornwar replication technique. A micro-processor controls the operation of the replicator, resulting in improved quality of snow crystal replicas as well as a decrease in data reduction time. This is accomplished by I) regulating the temperature of a heater bar designed to reduce blushing (condensed moisture on the film which obscures the detailed structures of replicated crystals), 2) ensuring uniform thickness of the Fornwar coating by adjusting the flow rate according to film speed, 3) encoding time on the film, and 4) monitoring motion of the film to ensure proper operation of the replicator. A description of this instrument is presented and details of its operation at SNOW II are discussed.

MP 1867 Changes in snow crystal characteristics during s are frequently observed. A continuous record

MP 1867 NEW METHOD FOR MEASURING THE SNOW-SURFACE TEMPERATURE.

Andreas, E.L., U.S. Army Cold Regions Research and Riginesring Laboratory. Special report, Dec. 1984, SR 84-35, Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984. Proceedings, Vol.1, p.161-169, ADB-090 935, 5 refs.

39-2959 SNOW SURFACE TEMPERATURE, HUMIDITY, HYGROMETERS, DEW POINT, SURFACE ROUGHNESS, METEOROLOGICAL DATA, THERMISTORS, ANALYSIS (MATHEMATICS). THERMISTORS, ANALYSIS (MATHEMATICS). Because of the tenuousness of a snow cover, measuring its surface temperature is not easy. The surface is ill-defined and easily disturbed; invasive transducers commonly used for other surfaces may thus be inappropriate for snow. A hygrometric method is described for measuring the snow-surface temperature; the advantages are that it is non-invasive and non-radiative and that it depends only weakly on the surface structure. The key assumption is that air at a now surface is in saturation with the snow; the dew-point temperature of the air is thus T(s), the surface temperature. Consequently, under the right conditions, by measuring the dew-point temperature 10 cm above the surface, we, in effect, measure the surface temperature.

OVERVIEW OF METEOROLOGICAL AND SNOW COVER CHARACTERIZATION AT SNOW-TWO.

Bates, R.E., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-35, Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984. Proceedings, Vol.1, p.171-191, ADB-090 935, 6 refs.
O'Rrien H W.

O'Brien, H.W.

39-2959

39-2960
SNOW COVER DISTRIBUTION, SNOW PHYSICS, METEOROLOGICAL DATA, MILITARY
OPERATION, SNOW DEPTH, SNOW DENSITY,
UNFROZEN WATER CONTENT, TEMPERATURE DISTRIBUTION, GRAIN SIZE, TESTS.

TURE DISTRIBUTION, GRAIN SIZE, TESTS.

The performance of military airborne down-look systems, regardless of wavelength, depends upon the recognition of differences between target and background features as viewed through an intervening medium. In cold regions the background may consist partially or entirely of snow cover during winter months. Prediction or evaluation of system performance under such conditions requires detailed characterization of snow cover, meteorological situation and, in some cases, subsurface features such as soil. This paper presents a brief overview of meteorological and snow cover background measurements made at Camp Grayling, Michigan, during SNOW-TWO. Eight independent system tests were supported, each of which required meteorological and/or snow-cover "ground-truth" characterization. Support was provided at four meteorological sites and seven snow cover characterization locations. Methodology is described briefly and a listing given of available data taken by CRREL in support of these tests.

MP 1869

APPROACH TO SNOW PROPAGATION MOD-ELING.

Koh, G., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-35, Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984. Proceedings, Vol.1, p.247-259, ADB-090 935, 9 refs. 39-2965

SNOWFALL, TRANSMISSIVITY, ATTENUA-TION, SNOW CRYSTAL STRUCTURE, SOLAR RADIATION, PARTICLE SIZE DISTRIBUTION, ELECTROMAGNETIC PROPERTIES, MATH-EMATICAL MODELS, FALLING BODIES, IN-FRARED RADIATION, RADIATION ABSORP-TION.

TION.

The attenuation of electromagnetic energy transmitted through falling snow can be determined if sufficient information regarding the physical and optical properties of airborne snow is known. Due to the complex and dynamic nature of falling snow the necessary parameters to predict transmission are often difficult to measure. Therefore it is necessary to carefully evaluate all the snow properties that are measurable in order to identify some ideal set of snow parameters that can be used to adequately model transmission through falling snow. A basic quantitative measurement of falling snow that can be continuously monitored is the mass concentration. Thus an approach to modeling transmistance through snow that can be continuously monitored is the mass concentra-tion. Thus an approach to modeling transmittance through airborne snow using mass concentration as one of the inputs should be thoroughly investigated. This paper explores a potential method of predicting transmittance based on mass concentration measurement, taking into consideration the size and shape of the snow crystals. Although the paper focuses on visible radiation the concepts discussed are also applicable to infrared radiation.

MP 1870 FORWARD-SCATTERING CORRECTED EX-TINCTION BY NONSPHERICAL PARTICLES.
Bohren, C.F., et al, U.S. Army Cold Regions Research
and Engineering Laboratory. Special report, Dec.
1984, SR 84-35, Snow Symposium, 4th, Hanover, NH,
Aug. 14-16, 1984. Proceedings, Vol.1, p.261-271,
ADB-090 935, 16 refs.

Koh. G.

SNOW CRYSTAL STRUCTURE, LIGHT SCATTERING, SNOWFLAKES, WAVE PROPAGATION, PARTICLES, ANALYSIS (MATHEMATION, PARTICLES, ANALYSIS) ICS).

ICS). Measured extinction of light by particles, especially those much larger than the wavelength of the light illuminating them, must be corrected for forward scattered light collected by the detector. Near-forward scattering by arbitrary nonspherical particles is, according to Fraunhofer diffraction theory, more sharply peaked than that by spheres of equal projected area. The difference between scattering by a nonspherical particle and that by an equal-area sphere is greater the more diffusely the particle's projected area is distributed about its centroid. Snowflakes are an example of large stmospheric particles that are often highly nonspherical. Calculations of the forward-scattering correction to extinction by ice needles have been made under the assumption that they can be approximated as randomly oriented prolate spheroids (aspect ratio 10:1). The correction factor can be as much as 20% less than that for equal-area spheres depending on the detector's acceptance angle and the wavelength. Randomly oriented oblate spheroids scatter more nearly like equal-area spheres. equal-area spheres.

MP 1871 DISCRETE REFLECTIONS FROM THIN LAY-

ERS OF SNOW AND ICE.

Jezek, K.C., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-35, Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984. Proceedings, Vol.1, p.323-331, ADB-090 935, 11 refs.

Clay, C.S. 39-2971

REMOTE SENSING, SNOW PHYSICS, ICE PHY-SICS, REFLECTION, RADAR ECHOES, WAVE PROPAGATION, SNOW ACOUSTICS, ICE ACOUSTICS, ELECTROMAGNETIC PROPER-

TIES.

A new approach was developed for computing the impulse response of a layered material. Our approach is different from other formulations in that we rely on a simple algorithm for polynomial division rather than the usual and more cumbersome matrix schemes. Our model is strictly valid for normally incident plane waves and does not allow for dispersion in a lossy material but we can account for geometrical spreading and believe the technique can be adapted for oblique incidence. The : twantages of our technique are simplicity and the impulse nature of the solution. Consequently, we can compute the band limited response of the layered material through a straightforward convolution of the impulse response with any desired source function. In this paper, we outline the method and discuss examples of radar waves reflected from layers of snow and ice. We suggest the method may be a convenient tool for modelers studying acoustic and electromagnetic reflections from snow and ice cover.

MP 1872 EXPLOSIVE OBSCURATION SUB-TEST RE-SULTS AT THE SNOW-TWO FIELD EXPERI-MENT.

Ebersole, J.F., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-35, Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984. Proceedings, Vol.1, p.347-354, ADB-090 935.

Williams, R.R., Bates, R.E. 39-2973

TRANSMISSIVITY, EXPLOSIVES, SNOW COV-ER, ICE COVER, VISIBILITY, ATTENUATION, TIME FACTOR, EXPLOSION EFFECTS, SANDS,

A series of explosive obscuration trials was conducted in January 1984 as a sub-test to the SNOW-TWO field experiment conducted in Grayling, MI. In this paper, a discussion is presented of the time/space-dependent obscuration effects produced by explosives detonated on snow/ice ground cover. In addition, time/space-dependent thermal signatures of the resulting craters are presented.

SNOW CHEMISTRY OF OBSCURANTS RELEASED DURING SNOW-TWO/SMOKE

Cragin, J.H., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-35, Snow Symposium, 4th, Hanover, NH, Aug. 14-16, 1984. Proceedings, Vol.1, p.409-416, ADB-

SMOKE GENERATORS, SNOW COMPOSITION, CHEMICAL ANALYSIS, SNOWFALL, INFRA-RED RADIATION, VISIBILITY, PARTICLE SIZE DISTRIBUTION, AEROSOLS.

MP 1874 SNOW AND ICE PREVENTION IN THE UNIT-ED STATES.

Minsk, L.D., Neve international, 1986, 28(1), p.37-42, In Italian with French, German and English summar-

40-4443
SNOW REMOVAL, ICE REMOVAL, ICE CONTROL, ROAD MAINTENANCE, WINTER MAINTENANCE, COUNTERMEASURES, SNOW ACCUMULATION, CHEMICAL ICE PREVENTION, UNITED STATES.

MP 1875

ANALYSIS OF RIVER WAVE TYPES.

Ferrick, M.G., Water resources research, Feb. 1985, 21(2), p. 209-220, 20 refs. 39-3098

WAVE PROPAGATION, RIVER FLOW, ICE JAMS, DAMS, ELECTRIC POWER, FLOODS, RAIN, MATHEMATICAL MODELS.

RAIN, MATHEMATICAL MODELS.

In this paper we consider long-period, shallow-water waves in rivers that are a consequence of unsteady flow. River waves result from hydroelectric power generation or flow control at a dam, the breach of a dam, the formation or release of an ice jam, and rainfall-runoff processes. The Saint-Venant equations are generally used to describe river waves. This paper is an investigation into areas which are fundamental to river wave modeling. The analysis is based on the concept that river wave behavior is determined by the balance between friction and inertia. The Saint-Venant equations are combined to form a system equation that is written in dimensionless form. The dominant terms of the system equation change with the relative magnitudes of a group of dimensionless soaling parameters that quantify the friction-inertia balance. These scaling parameters are continuous, indicating that the various river wave types and the transitions between them form a spectrum.

MP 1876 EFFECT OF ICE COVER ON HYDROPOWER PRODUCTION.

Yapa, P.D., et al, Journal of energy engineering, Sep. 1984, 110(3), p.231-234, 7 refs.

Shen, H.T. 39-3096

ICE COVER EFFECT, RIVER FLOW, RIVER ICE, WATER LEVEL, DAMS, ICE CONDITIONS, ELECTRIC POWER, ICE SURFACE, ICE COVER STRENGTH, SURFACE ROUGHNESS.

EFFECT OF SAMPLE ORIENTATION ON THE COMPRESSIVE STRENGTH OF MULTI-YEAR PRESSURE RIDGE ICE SAMPLES.

PRESSURE RIPGE ICE SAMPLES.
Richter-Menge, J.A., et al, Conference Arctic '85.
Proceedings. Civil engineering in the Arctic offshore.
Edited by F.L. Bennett and J.L. Machemehl, New
York, American Society of Civil Engineers, 1985,
p.465-475, 13 refs.
Cox, G.F.N.
39-3196
PRESSURE RIPGES. COMPRESSIVE PROPER.

PRESSURE RIDGES, COMPRESSIVE PROPER-TIES, ICE STRENGTH, IMPACT STRENGTH, STRAINS, POROSITY, ICE SAMPLING, BEAU-FORT SEA

Matched pairs of horizontal and vertical sea ice samples were taken from a multi-year pressure ridge in the Beaufort Sea. Each pair was tested in uniaxial constant strainrate compression to evaluate the effect of sample orientation on the compressive strength. The results indicate that sample orientation must be considered in the interpretation of ridge compressive strength. of ridge compressive strength data.

MP 1878

TRIAXIAL COMPRESSION TESTING OF ICE. Cox, G.F.N., et al, Conference Arctic '85. Proceedings. Civil engineering in the Arctic offshore. Edited by F.L. Bennett and J.L. Machemehl, New York, American Society of Civil Engineera, 1985, p.476-488,

Richter-Menge, J.A.

ICE STRENGTH, COMPRESSIVE PROPERTIES, STRESS, STRAIN DIAGRAMS, TESTS, MEASUR-ING INSTRUMENTS

ING INSTRUMENTS.

Procedures have been refined for performing constant-strain-rate triaxial tests on ice samples. The equipment is designed such that the confining pressure/axial stress ratio remains constant. Sample axial displacements are measured inside the cell on the sample and outside the cell between the cell and the loading piston. In addition to reviewing the development of the equipment and testing procedures, data are presented to illustrate the problems of using outside displacement measurements. In general, direct axial displacement measurements on the sample are essential to obtain accurate test strain rates and ice moduli. This is particularly true for brittle ice at low temperatures, high strain rates, and high confining pressures.

MP 1879

SHEAR STRENGTH IN THE ZONE OF FREEZ-ING IN SALINE SOILS.

Chamberlain, E.J., Conference Arctic '85. Proceedings. Civil engineering in the Arctic offshore. Edited by F.L. Bennett and J.L. Machemehl, New York, American Society of Civil Engineers, 1985, p.566-574, 4 refs.

39-3205

FROZEN GROUND STRENGTH, SALINE SOILS. SHEAR STRENGTH, DEFORMATION, SOIL FREEZING, CLAY SOILS, SANDS, SEA WATER, TEMPERATURE EFFECTS, TESTS.

TEMPERATURE EFFECTS, TESTS.

Laboratory direct shear strength tests were conducted on sand and clay oil samples as they were freezing. Samples prepared with seawater and distilled water were tested in a modified direct shear box at shear plane temperatures ranging from 0 C to -5 C. The shear strengths of the freezing saline clay and sand samples were observed to esignificantly less than shear strengths of the free water samples. For the clay samples, these shear strength differences could be accounted for principally by the 1.8 C freezing point depression caused by the salts in the sea water, the two shear strength curves nearly paralleling and overlapping each other when plotted versus temperature below freezing. In a similar plot for the sands, the two curves diverge considerably from a common strength at 0 C. It is shown that the shear strength reduction of the saline clay soil is principally the result of increased unfrozen water content. It is postulated that knowledge of unfrozen water content relationships for frozen saline soils will probably allow better predictive capabilities for the shear strength in the freezing zone.

EXPLORATION OF A RIGID ICE MODEL OF FROST HEAVE.

O'Neill, K., et al, Water resources research, Mar. 1985, 21(3), p.281-296, 29 refs.
Miller, R.D.

39-3276

39-3276
FROST HEAVE, GROUND ICE, ICE MODELS, ICE LENSES, FREEZING RATE, ICE GROWTH, MATHEMATICAL MODELS, FROZEN GROUND THERMODYNAMICS.

A numerical model is explored which simulates frost heave in saturated, granular, air-free, solute-free soil. It is based on equations developed from fundamental thermomechanical considerations and previous laboratory investigations. Al-though adequate data are lacking for strict experimental verification of the model, we note that simulations produce an overall course of events together with significant specific features which are familiar from laboratory experience.

Simulated heave histories show proper sensitivities in the shapes and orders of magnitude of output responses and in the relations between crucial factors such as heave rate, 'reezing rate, and overburden.

SIMILARITY SOLUTIONS OF THE CAUCHY PROBLEM OF HORIZONTAL FLOW OF WATER THROUGH POROUS MEDIA FOR EX-PERIMENTAL DETERMINATION OF DIF-

Nakano, Y., Advances in water resources, Mar. 1985, 8(1), p.26-31, 23 refa. 39-3379

POROUS MATERIALS, WATER FLOW, DIFFU-SION, WATER CONTENT, MATHEMATICAL MODELS, EXPERIMENTATION.

An experimental method for determining diffusivity is studied by using similarity solutions of the Cauchy problem of horizontal flow of water through homogeneous porous media. The theoretical justification of the method is presented by applying a mathematical theorem recently derived by Van Duyn. Some important aspects of data analysis are discussed by using actual experimental data.

MP 1882

NUMERICAL SIMULATION OF NORTHERN HEMISPHERE SEA ICE VARIABILITY, 1951-

Walsh, J.E., et al, Journal of geophysical research, May 20, 1985, 90(C3), p.4847-4865, 36 refs. Hibler, W.D., III, Ross, B.

39-3431

SEA ICE, ENVIRONMENT SIMULATION, SEA-SONAL VARIATIONS, ICE MODELS, DRIFT, ICE COVER THICKNESS.

The model is run with a daily time step and is forced by interannually varying fields of geostrophic wind and termperature-derived thermodynamic fluxes. The results include documentation of the sensitivities to the source of the thermodynamic forcing data and to the number of thickness levels in the thermodynamic formulation.

The fields of ice velocity and thinkness levels are the sensitivities to the source of the thermodynamic formulation. in the thermodynamic formulation. The fields of ice velocity and thickness show strong seasonal as well as interannual variability. The Pacific gyre is found to be well-developed in spring and autumn but less so in winter and summer. The simulated velocities show no bias but considerable acatter relative to the drift of the Arctic buoys in 1979 and 1980. An analysis of the regional mass budgets shows that the normal seasonal cycle is controlled primarily by the thermodynamic processes but that the thickness anomalies in much of the Arctic are attributable primarily to dynamic processes contribute more strongly to summer anomalies near the ice edge. The tendency for ice anomalies to be advected by the pattern of mean drift is apparent in multisesson lag correlations involving subregions of the Arctic Basin and the peripheral seas. (Auth. mod.)

MP 1883 GROWTH AND MECHANICAL PROPERTIES

OF RIVER AND LAKE ICE.
Ramseier, R.O., Quebec, P.Q., Université Laval, Feb.
1972, 243p., Ph.D. thesis. Corrected Oct. 1975.

119 refs. 39-3387

J3-33-6 (ICE MECHANICS, RIVER ICE, LAKE ICE, ICE GROWTH, ICE CRYSTAL STRUCTURE, ICE PHYSICS, SNOW ICE, TEMPERATURE EFFECTS, METEOROLOGICAL FACTORS, GRAIN SIZE, ICE CREEP, EXPERIMENTATION.

SCIENCE PROGRAM FOR AN IMAGING RADAR RECEIVING STATION IN ALASKA. Weller, G., et al, Pasadena, CA, U.S. National Aeronautics and Space Administration, Dec. 1, 1983,

45p., 19 refs. Carsey, F., Holt, B., Rothrock, D.A., Weeks, W.F. 39-3415

39-3415
REMOTE SENSING, ICE CONDITIONS, STATIONS, RESEARCH PROJECTS, SEA ICE DISTIONS, RESEARCH PROJECTS, SEA ICE DISTRIBUTION, OCEANOGRAPHY, MARINE GEOLOGY, GLACIOLOGY, VEGETATION, UNITED STATES—ALASKA, ARCTIC OCEAN.

There would be broad scientific benefit in cetablishing in Alaska an imaging radar receiving station that would collect data from the Buropean Space Agency's Remote Sensing Satellite, ERS-1; this station would acquire imagery of the ice cover from the American territorial waters of the Beaufort, Chukchi, and Bering Seas; this station, in conjunction with similar stations proposed for Kiruna, Sweden, and Prince Albert, Canada, would provide synoptic coverage of nearly the entire Arctic. The value of such coverage to aspects of oceanography, geology, glaciology, and botany is considered.

MP 1885 CONTROLLING RIVER ICE TO ALLEVIATE ICE JAM FLOODING.

Deck, D.S., IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.3, [1984], p.69-76, 4 refs. 39-3471

ICE CONTROL, RIVER ICE, ICE JAMS, FLOODS, ICE BOOMS, ICE BREAKUP, ICE COVER THICKNESS, MODELS, COUNTERMEASURES.

NESS, MODELS, COUNTERMEASURES.

Many communities affected by ice jam flooding have accepted the event as unpreventable. Others have approached their problem as one of open channel flow and implemented standard projects such as channel modifications or dikes to combat their flooding. We feel that the best approach is to control the river ice before it poses a problem, by controlling either freeze-up or break-up. This paper addresses our involvement at two areas where ice jam flooding has caused severe economic hardship and loss of life. An ice boom has been used to control the formation of river ice at Oil City, Pennsylvania, and a permanent ice control suructure will be constructed on Cazenovia Creek in West Seneca, New York, to control the river ice during break-up.

MP 1886

4TH REPORT OF WORKING GROUP ON TEST-ING METHODS IN ICE.

Earle, E.N., et al, IAHR International Symposium on Earle, E.N., et al, IAHK international symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.4, [1984], p.1-41, Refs. passim. Frederking, R., Gavrilo, V.P., Goodman, D.J., Häusler, F.U., Mellor, M., Petrov, I.G., Vaudrey, K. 39-3494

ICE PHYSICS, ICE STRENGTH, AIR ENTRAIN-MENT, ICE FRICTION, COMPRESSIVE PROP-ERTIES, FLEXURAL STRENGTH.

MP 1887

PORCES ASSOCIATED WITH ICE PILE-UP AND RIDE-UP.

Sodhi, D.S., et al, IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.4, (1984), p.239-262, Refs. p.257-262. Kovaci

ICE LOADS, ICE PILEUP, ICE OVERRIDE, FLOATING ICE, ICE MECHANICS, ICE PRESSURE, ICE SOLID INTERFACE, WIND FAC-SURE, ICE SOLID INTERFACE, WIND FACTORS, OCEAN WAVES, ANALYSIS (MATHEMATICS), PRESSURE RIDGES.

EMATICS), PRESSURE RIDGES.

A review of the literature on shore ice pile-up and rideup observations is presented along with the average forces associated with the phenomena. Besides wind/water driving forces, it is postulated that storm surges or waves may also carry the floating ice sheet farther inland, where damage to structures and human lives is possible. A brief review is presented of the analytical and experimental work done to understand the behavior of ice sheets in relation to its piling or riding up the beach. A short summary of each model study that is reported in open literature is also given.

HEAT AND MOISTURE ADVECTION OVER ANTARCTIC SEA ICE.

Andreas, E.L., Monthly weather review, May 1985, 113(5), p.736-746, 27 refs. 39-3554

ICE EDGE, HEAT LOSS, SEA ICE DISTRIBU-TION, PACK ICE, ANTARCTICA—WEDDELL

SEA.

Surface-level meteorological observations and upper-air soundings in the Weddell Sea provide the first in situ look at conditions over the deep antarctic ice pack in the spring. The surface-level temperature and humidity were relatively high, and both were positively correlated with the northerly component of the 850 mb wind vector as far as 600 km from the ice edge. Since even at its maximum extent, at least 60% of the antarctic ice pack is within 600 km of the open ocean, long-range atmospheric transport of heat and moisture from the ocean must play a key part in antarctic sea ice heat and mass budgets. From one case study, the magnitude of the ocean's role is inferred: at this time of year the total turbulent surface heat loss can be greater under southerly winds than under northerly ones. (Auth.)

ENERGY EXCHANGE OVER ANTARCTIC SEA ICE IN THE SPRING.

Andreas, E.L., et al, Journal of geophysical research, July 20, 1985, 90(C4), p.7199-7212, Refs. p.7211-

Makshtas, A.P.

39-3640

SEA ICE, ABLATION, RADIATION BALANCE, HEAT FLUX.

In October and November of 1981, during the U.S.-USSR Weddell Polynya Expedition, we made the first measurements ever of the turbulent and radiative fluxes over the interior pack ice of the southern ocean. The daily averaged, surface-averaged sum of these fluxes—the so-called balance, which comprises the conductive, heat storage, and phase-change

terms—was positive for all but one day during the cruise: the ablation season had begun. Variability in the sum of the turbulent fluxes produced most of the variability in the balance. These turbulent fluxes generally correlated with the geostrophic wind—a northerly wind (in off the cossa) transferring heat to the surface, and a southerly wind resnoving it. (Auth.)

MP 1290

USE OF REMOTE SENSING FOR THE U.S. ARMY CORPS OF ENGINEERS DREDGING PROGRAM.

PROGRAM.

McKim, H.L., et al, International Symposium on Remote Sensing of Environment, 18th, Paris, France, Oct. 1-5, 1984. Proceedings, Ann Arbor, Environmental Research Institute of Michigan, [1985], p.1147-1149. Klemas, V., Gatto, L.W., Merry, C.J. 39-3707.

REMOTE SENSING, DREDGING, SEDIMENT TRANSPORT, CHANNELS (WATERWAYS), SUSPENDED SEDIMENTS, ENVIRONMENTAL

IMPACT.

The objectives of this study were to review the uses of existing remote sensing techniques for providing data in the Corps of Engineers dredging program, to define promising new techniques for minotoring dredging operations, and to recommend those techniques that should be used now and those to be developed for future use. The uses for which remote sensing techniques were evaluated include: channel surveys and engineering considerations, monitoring of sediment different and suspended sediment concentration, disposal site selection and minitoring of environmental effects at disposal sites, and long-range dredged material disposal management strategies.

MAD 1801.

FULL-CYCLE HEATING AND COOLING PROBE METHOD FOR MEASURING THER-MAL CONDUCTIVITY.

McGaw, R., Journal of heat transfer, [1984], No.84-WA/HT-109, 8p., 32 refs.

39-3902

THERMAL CONDUCTIVITY, COOLING, HEAT-ING, THERMAL DIFFUSION, ANALYSIS (MATHEMATICS), TESTS.

(MATHEMATICS), TESTS.

A modification of the traditional probe test procedure is described which incorporates the cooling stage that succeeds each heating stage. The improved procedure enables a second value of thermal conductivity to be determined for each test. A comparison between the two values gives a measure of the experimental error for the test, and provides a means by which physical changes within the test specimen may be detected. If the ambient test temperature of the specimen has altered during a test, the effect on the test values may also be determined through a comparison of the heating-stage and cooling-stage temperatures.

AMP 1802

MP 1892 AUTOMATED SOILS FREEZING TEST.

Chamberlain, B.J., National Conference on Microcomputers in Civil Engineering, 2nd, Orlando, Florida, Oct. 30-Nov. 1, 1984. Proceedings. Edited by W.E. Carroll, [1985], 5p., 2 refs.

SOIL FREEZING, FREEZE THAW CYCLES, FROST HEAVE, FREEZE THAW TESTS, THER-MOCOUPLES, COMPUTER PROGRAMS.

MOCOUPLES, COMPUTER PROGRAMS.

An inexpensive data acquisition/control system is used to control the freeze-thaw cycling and data logging in a new laboratory freezing test. The test imposes two freeze-thaw cycles on four soil samples. The data logger is set up with 3-10 channel multiplexer cards for analog measurement and actuator control. Two of the multiplexer cards are configured for a total of 36 single-ended thermocouple measurements which are accurate to plus or minus 0.1 C. The third multiplexer card is configured with two actuator switches to control the temperatures of two refrigerated circulating baths and with five double-ended channels to read the output of four linear motion DC transformers and one power supply. The data acquisition/control unit is controlled using a HP41CX hand-held calculator and the HP-IL serial interface loop. A thermal printer, tape cassette deck and x-y plotter are used to print out, store and plot the test data. The calculator is programmed with over 30 programs and subroutines to control the temperature, and to reduce, print out, store and plot the test data.

MP 1893 2-D TRANSIENT PREEZING IN A PIPE WITH TURBULENT FLOW, USING A CONTINUALLY DEFORMING MESH WITH FINITE ELE-MENTS.

Albert, M.R., et al, International Conference on Numerical Methods in Thermal Problems, 3rd, Seattle, WA, Aug. 2-5, 1983. Proceedings. Edited by R.W. Lewis, J.A. Johnson and W.R. Smith, Swansea, U.K., Pineridge Press, 1983, p.102-112, 10 refs. O'Neill, K.

PIPELINE FREEZING, TURBULENT FLOW, HEAT FLUX, HEAT TRANSFER, ANALYSIS (MATHEMATICS), FLOW RATE.

MP 1894 SOLUTION OF 2-D AXISYMMETRIC PHASE CHANGE PROBLEMS ON A FIXED MESH, WITH ZERO WIDTH PHASE CHANGE ZONE. O'Neill, K., International Conference on Numerical Methods in Thermal Problems, 3rd, Seattle, WA, Aug. 2-5, 1983. Proceedings. Edited by R.W. Lewis, J.A. Johnson and W.R. Smith, Swansea, U.K., Pineridge Press, 1983, p.134-146, 21 refs. 20.2065

39-3905
THERMAL CONDUCTIVITY, ENTHALPY, ARTIFICIAL PREEZING, HEAT CAPACITY, PHASE
TRANSFORMATIONS, SOIL FREEZING,
BOUNDARY LAYER, ANALYSIS (MATHEMAT-

ICS).

A new method is presented for solving two-dimensional axisymmetric heat conduction problems with phase change. A strict discontinuity between phases is assumed, and no artificially smoothed enthalpy transition between phases need be introduced. Step changes across phase boundaries in the sensible heat capacity and thermal conductivity are accommodated, when the phase change isotherm cuts arbitrarily across a fixed meah of linear triangular finite elements. Latent heat effects are accounted for through a Dirac delta function in the heat capacity. This is absorbed mathematical function in the course of ordinary Galerkin finite element entities in the course of ordinary Galerkin finite element procedures. Computed results agree well with analytical solutions in the limited cases where they are available, and numerical results in more general cases behave quite reasonably.

MP 1895

COMPUTATION OF POROUS MEDIA NATU-BAL CONVECTION FLOW AND PHASE

O'Neill, K., et al, International Conference on Finite Elements in Water Resources, 5th, Burlington, VT, June 1984. Proceedings. Edited by J.P. Laible, C.A. Brebbia, W. Gray and G. Pinder, Berlin, Springer-Verlag, 1984, p.213-229, 13 refs. Albert, M.R. 39-3981

39-39-39-19
POROUS MATERIALS, FLUID FLOW, PHASE
TRANSFORMATIONS, CONVECTION, HEAT
TRANSFER, HEAT CAPACITY, BOUNDARY
LAYER, COMPUTER APPLICATIONS, ANAL-YSIS (MATHEMATICS).

MP 1896

ROLE OF PHASE EQUILIBRIUM IN FROST HEAVE OF FINE-GRAINED SOIL UNDER NEG-LIGIBLE OVERBURDEN PRESSURE.

Nakano, Y., et al, Advances in water resources, June 1985, 8(2), p.50-68, 17 refs. Horiguchi, K. 40-33

40-33
PROST HEAVE, UNFROZEN WATER CONTENT, SOIL WATER, SUPERCOOLING, PRESURE, PHASE TRANSFORMATIONS, SOIL FREEZING, ANALYSIS (MATHEMATICS).

FREBZING, ANALYSIS (MATHEMATICS). The role of the phase equilibrium of water in frost heave was studied for two kinds of soil. The rate of frost heave was the rate of water intake were measured simultaneously under various rates of heat removal. The experimental data revealed a trend common for both soils that the rate of water intake attains its maximum at a certain critical rate of heat removal. The data were analyzed by using equations accurately describing the relation between these rates. The results of the analysis indicate a serious doubt about the validity of phase equilibrium in the system. Alternatively, an assumption was introduced that supercooling occurred between a frost front and an unfrozen part of the soil. It was shown that supercooling could explain the data well under certain conditions.

EXPERIMENTAL STUDY ON FACTORS AF-FECTING WATER MIGRATION IN FROZEN MORIN CLAY.

Xu, X., et al, Ground freezing. Proceedings of the 4th International Symposium on Ground Freezing, Sapporo, Japan, Aug. 5-7, 1985. Edited by S. Kinoshita and M. Fukuda. Rotterdam, A.A. Balkema, 1985, .123-128.

Oliphant, J.L., Tice, A.R. 40-213

FROZEN GROUND PHYSICS, SOIL WATER MI-GRATION, CLAY SOILS, FROST HEAVE, DEN-SITY (MASS/VOLUME), SATURATION, SOIL FREEZING, TEMPERATURE GRADIENTS, TESTS.

TES1S.

The amount of water migration in an unsaturated frozen soil, morin clay, was determined in horizontally closed soil columns under linear temperature gradients. The temperature at the warm end of the soil column was below its freezing point at the initial water content in order to keep the soil specimen always in the frozen state during testing. The flux of water migration was calculated from the distribution curves of the total water content before and after testing.

Four factors affecting the flux, including temperature, tempera-ture gradient, test duration and the dry density of the soil, were investigated. It was found that the flux is directly proportional to the temperature gradient, is inversely propor-tional to the square root of the test duration, decreases with the decrease in temperature in the power law form, and changes with the dry density. The behavior of water migration in unsaturated, frozen morin clay is something like that in the unsaturated, unfrozen soils.

MP 1898

STRAIN RATE EFFECT ON THE TENSILE STRENGTH OF FROZEN SILT.
Zhu, Y., et al, Ground freezing. Proceedings of the 4th International Symposium on Ground Freezing, Sapporo, Japan, Aug. 5-7, 1985. Edited by S. Kinoshita and M. Fukuda, Rotterdam, A.A. Balkema, 1985, p.153-157, 9 refs.

p.153-157, y feel. Carbee, D.L. 40-217 FROZEN GROUND STRENGTH, PERMAFROST PHYSICS, STRAINS, TENSILE PROPERTIES, TEMPERATURE EFFECTS, DENSITY (MASS/-VOLUME), TESTS.

VOLUME), TESTS.

Tension tests at constant rates were conducted on remolded asturated frozen Fairbanks silt with medium density at 5 C for various machine speeds. It is found that the tensile strength depends strongly upon strain rate and the critical strain rate for ductile-brittle transition was about 1/100s. The peak tensile strength considerably decreases with decreasing strain rate for ductile failure, while it alightly decreases with increasing strain rate for ductile failure, while it alightly decreases with increasing strain rate in the brittle region. The failure strain also varies with strain rate, but the initial tangent modulus is found not to be dependent upon strain rate.

MP 1899

KADLUK ICE STRESS MEASUREMENT PRO-GRAM.

Johnson, J.B., et al, International Conference on Port Johnson, J.B., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 8th, Narssarssuad, Greenland, Sep. 7-14, 1985. Proceedings, Vol. 1, Hornholm, Denmark, Danish Hydraulic Institute, 1985, p.88-100, 9 refs.
Cox. G.F.N., Tucker, W.B.

40-268

40-268
ICE SHEETS, STRESSES, ICE LOADS, OFF-SHORE STRUCTURES, ICE CONDITIONS, ICE
PRESSURE, THERMAL EXPANSION.

Cylindrical biaxial stress sensors were used to measure ice
stress varied in a complex manner both laterally and with
depth in the ice sheet. Average stresses were calculated
and summed across the ice peninsula to determine the ice
load acting on the structure. The maximum measured
average stress and corresponding calculated structural load
during the experiment were shout 300 kPa and 150 MN
respectively. All significant measured stresses were caused
by thermal expansion of the ice sheet.

MP 1908

MP 1900 ICE ISLAND FRAGMENT IN STEFANSSON SOUND, ALASKA.

Kovacs, A., International Conference on Port and Ocean Engineering under Arctic Conditions, 8th, Narssarssuaq, Greenland, Sep. 7-14, 1985. Proceedings, Vol.1, Hörsholm, Denmark, Daniah Hydraulic Institute, 1985, p.101-115, 9 refs. 40-269

ICE ISLANDS, ICE STRENGTH, ICE PHYSICS, GROUNDED ICE, CALVING, ICE COVER THICKNESS, ICE SALINITY, ICE DENSITY, ICE TEMPERATURE, STATISTICAL ANALYSIS.

TEMPERATURE, STATISTICAL ANALYSIS.

A small ice island fragment was found in a unique location southwest of Cross Island, Alaska, in April 1983. Investigations were made to determine the thickness, salinity, density, internal temperature, and strength of the ice island co. Measurements were also made which revealed that the ice Measurements were also made which revealed that the ice island had gouged into the seabed when it was driven into shallower waters. Implications of this ice feature to offshore petroleum development are discussed.

APPARENT UNCONFINED COMPRESSIVE STRENGTH OF MULTI-YEAR SEA ICE.

Kovacs, A., International Conference on Port and Ocean Engineering under Arctic Conditions, 8th, Narssarssuaq, Greenland, Sep. 7-14, 1985. Proceedings, Vol. 1, Hörsholm, Denmark, Danish Hydraulic Institute, 1985, p.116-127, 4 refs.

40-270 ICE STRENGTH, SEA ICE, ICE LOADS, COM-

ICE STRENGTH, SEA ICE, ICE LOADS, COM-PRESSIVE PROPERTIES, ICE TEMPERATURE, ICE DENSITY, BRINES, TESTS.

An axial double-ball load test system for determining the apparent unconfined compressive strength of multi-year sea coe was evaluated. The effects of loading ball size, ice temperature, and brine free density on the apparent unconfined compressive strength of the ice were investigated. Axial double-ball load test results are compared with those obtained

from labor intensive conventional unconfined compression tests made on similar density ice. The results from the two testing methods were found to agree very well, indicating that the axial double-ball load test may be used to provide a rapid method for determining an apparent unconfined compressive strength index for ice.

MP 1902 INVESTIGATION OF THE ELECTROMAGNET-IC PROPERTIES OF MULTI-YEAR SEA ICE.

Morey, R.M., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 8th, Narssarssuaq, Greenland, Sep. 7-14, 1985. Proceed-ings, Vol.1, Hörsholm, Denmark, Danish Hydraulic Institute, 1985, p.151-167, 11 reft.

Kovaca, A.

ACTUAL STREET, ALL MODELS, BRINES, RADAR STREET, ICE MAGNETIC PROPERTIES, SEA ICE, ICE COVER THICKNESS, ICE BOTTOM SURFACE, REMOTE SENSING, PROFILES, ICE DETECTION, ICE STRUCTURE, ICE MODELS, BRINES, RADAR STREET, ALL MODELS, ALL MODELS, ALL MODELS, ALL MODELS, ALL MODELS, ALL ECHOES.

STRUCTURE, ILLE PROCESS.

Sounding of multi-year sea ice, using impulse radar operating in the 30- to 500-MHz frequency band, revealed that the bottom of this ice could not always be detected. This paper discusses the results of a field program aimed at finding out why the bottom of thick multi-year sea ice could not be profiled and at determining the electromagnetic (BM) properties of multi-year sea ice. It was found that the bottom of the ice could not be detected when the ice structure had a high brine content. Because of brine's high conductivity, its volume dominates the loss mechanism in first-year sea ice, and the same was found true for multi-year sea ice. A two-phase dielectric mixing formula, used by the authors for describing the EM properties of first-year sea ice, was modified to include the effects of the gas pockets found in the multi-year sea ice. This three-phase mixture model was found to estimate the BM properties of the multi-year ice studied over the frequency band of of the multi-year ice studied over the frequency band of interest. The latter values were determined by 1) vertical sounding to a subsurface target of known depth and 2) cross-borehole transmission measurements.

PHYSICAL PROPERTIES OF SEA ICE IN THE GREENLAND SEA.

GREENLAND SEA.
Tucker, W.B., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 8th, Narsaarssuaq, Greenland, Sep. 7-14, 1985. Proceedings, Vol.1, Hörsholm, Denmark, Danish Hydraulic Institute, 1985, p.177-188, 9 refs.
Gow, A.J., Weeks, W.F.
40-275

40-275
ICE PHYSICS, SEA ICE, PACK ICE, ICE SALINITY, ICE TEMPERATURE, ICE COVER THICKNESS, ICE CRYSTAL STRUCTURE, SNOW
DEPTH, GREENLAND SEA.

DEPTH, GREENLAND SEA.

The physical properties of sea ice in the Fram Strait region of the Greenland Sea were examined during June and July 1984 in conjunction with the MIZEX field program. The properties of the pack ice in the Fram Strait are believed to be representative of ice from many locations within the Arctic Basin since Fram Strait is the major ice outflow region for the Basin. Most of the lice observed and sampled was multi-year. The majority of the first-year ice appeared to have been deformed prior to entering Fram Strait. The properties measured at each sampling site included salinity, temperature, thickness, crystal structure and snow depth. The measured salinities agreed well with those taken during summer at other locations in the Arctic. An important inding was that snow depths on multi-year ice were much larger than those on first-year ice. Finally, the crystal exture analysis indicated that about 75% of the ice consisted of congelation ice with typically columnar type crystal structure. The remaining 25% consisted of granular ice.

MP 1904 NUMERICAL SIMULATION OF ICE GOUGE FORMATION AND INFILLING ON THE SHELF OF THE BEAUFORT SEA. Weeks, W.F., et al, International Conference on Port

weeks, w.r., et al, international Conference on Port and Ocean Engineering under Arctic Conditiona, 8th, Narsaarssuaq, Greenland, Sep. 7-14, 1985. Proceedings, Vol.1, Hörsholm, Denmark, Danish Hydraulic Institute, 1985, p.393-407, 12 refs. Tucker, W.B., Niedoroda, A.W.

40-294 ICE SCORING, BOTTOM TOPOGRAPHY, BOTTOM SEDIMENT, OCEAN BOTTOM, SEDIMENT TRANSPORT, MODELS, DISTRIBUTION, COMPUTER APPLICATIONS, BEAUFORT SEA COMPUTER APPLICATIONS, BEAUFORT SEA. A simulation model for sea ice-induced gauges on the shelf of the Beaufort Sea is developed by assuming that annual occurrence of new gauges is given by a Poisson distribution, locations of the gauges are random, and distribution of gauge depths is specified by an exponential distribution. Once a gauge is formed it is subject to infilling by transport of sediment into the region and by local movement of sediment along the sea Boor. These processes are modeled by assuming a sediment input based on stratigraphic considerations and by calculating bedieded transport using methods from sediment transport theory. It is found that if currents are sufficient to transport sediment, rapid infilling of gouges

MP 1905
REVIEW OF EXPERIMENTAL STUDIES OF
UPLIFTING FORCES EXERTED BY ADFROZEN ICE ON MARINA PILES.

Christensen, F.T., et al, International Conference on Port and Ocean Engineering under Arctic Conditions, 8th, Narssarssuag, Greenland, Sep. 7-14, 1985. Pro-ceedings, Vol.2, Hörsholm, Denmark, Danish Hydrau-lic Institute, 1985, p.529-542, 30 refs.

Zabilansky, L.J.

PILE EXTRACTION, ICE ADHESION, WATER LEVEL, SHEAR PROPERTIES, FLEXURAL STRENGTH, ICE COVER EFFECT, ICE SOLID INTERFACE, ICE LOADS, ICE PHYSICS, CONTENTACE, ICE LOADS, ICE PHYSICS, CONTENTACE, ICE LOADS, ICE PHYSICS, CONT STRUCTION MATERIALS.

Over the last decade the problem of pile jacking has been studied experimentally, both in the field and in laboratory studies. This paper reviews the findings of these studies and suggests subjects for further research.

MP 1906
SHEET ICE FORCES ON A CONICAL STRUCTURE: AN EXPERIMENTAL STUDY.
Sodhi, D.S., et al, International Conference on Port

and Ocean Engineering under Arctic Conditions, 8th, Narasarssuaq, Greenland, Sep. 7-14, 1985. Proceedings, Vol.2, Hörsholm, Denmark, Danish Hydraulic Institute, 1985, p.643-655, 11 refs. Morris, C.E., Coz, G.F.N.

40-312
ICE PRESSURE, ICE SHEETS, OFFSHORE
STRUCTURES, ICE LOADS, FLEXURAL
STRENGTH, SURFACE PROPERTIES, ICE
LOADS, FRICTION, EXPERIMENTATION.

LOADS, FRICTION, EXPERIMENTATION.

Small-scale experiments were performed to determine sheet ice forces on a conical structure. The experiments were conducted with a 45 deg upward-breaking conical structure which had diameters of 1.5 m at the waterline and 0.33 m at the top. The surface of the structure was initially smooth; later it was roughened to investigate the effect of surface friction on the ice load. The thickness and the flexural attength of ice sheets were varied, and the tests were conducted at three fixed velocities.

MP 1907 MP 1907
GRAIN SIZE AND THE COMPRESSIVE STRENGTH OF ICE.
Cole, D.M., Journal of energy resources technology, Sep. 1985, 107(3), p.369-374, 15 refs.

40-363

ICE STRENGTH, ICE MECHANICS, COMPRES SIVE PROPERTIES, GRAIN SIZE, LOADS (PORCES), ICE CRYSTAL STRUCTURE, STRESS STRAIN DIAGRAMS, ICE CRACKS, TEMPERA-

STRAIN DIAGRAMS, ICE CRACKS, TEMPERATURE EFFECTS, FRACTURING.

This work presents the results of uniaxial compression tests on freshwater polycrystalline ice. Grain size of the test material ranged from 1.5 to 5 mm, strain rate ranged from 1/1,000,000 to 1/100/s and the temperature was 5 C. The grain size effect emerged clearly as the strain rate increased to 1/100,000/s and persisted to the highest applied strain rates. On average, the stated increase in grain size brought about a decrease in peak stress of approximately 31 percent. The occurrence of the grain size effect coincided with the onset of visible cracking. The strength of the material increased to a maximum at a strain rate of 1/1,000/s, and then dropped somewhat as the strain rate increased further to 1/100/s. Strain at peak stress generally tended to decrease with both increasing grain size and increasing train rate. The results are discussed in terms of the deformation mechanisms which lead to the observed behavior.

MP 1908 TENSILE STRENGTH OF MULTI-YEAR PRES-

SURE RIDGE SEA ICE SAMPLES. Cox, G.F.N., et al, Journal of energy resources technology, Sep. 1985, 107(3), p.375-380, 20 refs. Richter-Menge, J.A.

40-364
PRESSURE RIDGES, ICE STRENGTH, TENSILE PROPERTIES, SEA ICE, STRAINS, TESTS.
Thirty-six constant strain-rate uniaxial tension tests were performed on vertically oriented multi-year pressure ridge samples from the Beaufort Sea. The tests were performed on a closed-loop electro-hydraulic testing machine at two strain rates (1/10,000 and 1/1,000/s) and two temperatures (-20 and -5 C). This paper summarizes the sample preparation and testing techniques used in the investigation and presents data on the tensile strength, initial tangent modulus, and failure strain of the ice.

MP 1909
COMPARISON OF SPOT SIMULATOR DATA
WITH LANDSAT MSS IMAGERY FOR DELINEATING WATER MASSES IN DELAWARE
BAY, BROADKILL RIVER, AND ADJACENT
WEILANDS.
Ackleson, S.G., et al, Photogrammetric engineering
and remote sensing, Aug. 1985, 60(8), p.1123-1129, 5
refs.

Klemas, V., McKim, H.L., Merry, C.J.

WATER RESERVES, REMOTE SENSING, HYDRODYNAMICS, RADIOMETRY, LANDSAT, WATER FLOW, DELAWARE BAY.

WATER FLOW, DELAWARE BAY.

The rediometric and spatial qualities of SPOT simulator and Landsat-3 MSS data are compared as to their shility to distinguish different water masses within Delaware Bay and adjacent wetland areas. The SPOT simulator data contain a greater range of gray level values for all water areas than do the Landsat MSS data. The greater spatial resolution of the SPOT simulator data provides information about small-scale hydrodynamics not available on the Landsat MSS data. Both types of data show a plume of spectrally unique water flowing from Roosevelt Inlet into Delaware Bay. The plume is most visible in SPOT simulator band it (300-590 nm) and Landsat MSS band 4 (500-690 nm). In both bands, the plume appears dark relative to the surrounding Delaware Bay water. Rocent hydrographic surveys characterize the plume as an ebb tidal feature with high concentrations of dissolved and particulate organic matter believed to originate from the adjacent Canary Creek Marsh and Great Marsh. SPOT simulator data are found to delineate water masses with a high degree of separation. Radiometrically degraded SPOT data produce similar results. Landsat-3 MSS data, although useful for delineating water masses, do not produce good separation because of sensor noise.

SIMULATED SEA ICE USED FOR CORRELAT-ING THE ELECTRICAL PROPERTIES OF THE ICE WITH ITS STRUCTURAL AND SALINITY CHARACTERISTICS.

Gow, A.J., International Geoscience and Remote Sensing Symposium (IGARSS '85), Amherst, MA, Oct. 7-9, 1985. Digest, Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1985, p.76-82.

ICE ELECTRICAL PROPERTIES, SEA ICE, ICE CRYSTAL STRUCTURE, ICE SALINITY, REMOTE SENSING, REPLECTIVITY, ICE COVER THICKNESS, ICE GROWTH, EX-PERIMENTATION.

DIELECTRIC PROPERTIES AT 4.75 GHZ OF SALINE ICE SLABS.

Remote Sensing Symposium (IGARSS '85), Amherst, MA, Oct. 7-9, 1985. Digest, Vol. 1, New York, Institute of Electrical and Electronics Engineers, Inc., 1985, p.83-86, 10 refs. McGrew, S.G. 40-410

ICE ELECTRICAL PROPERTIES, SEA ICE, ICE SALINITY, MICROWAVES, DIELECTRIC PROP-ERTIES, RADIOMETRY, BRINES, EXPERIMEN-

TATION.

The complex relative dielectric permittivity of saline ice alabs removed from an artificially grown ice sheet has been measured at 4.75 GHz as a function of temperature. The frequency lies within the range used by other researchers who conducted radiometric tests concurrently on the same ice sheet. The alabs were placed between open waveguide radiators and dielectric properties calculated from the forward scattering coefficient. The results show both real (k²) and imaginary (k²) parts to vary almost in direct proportion to the brine volume. However, the values for k² show more variation, probably due to scattering.

MP 1912 LABORATORY STUDIES OF ACOUSTIC SCAT-TERING FROM THE UNDERSIDE OF SEA ICE. Jezek, K.C., et al, International Geoscience and Remote Sensirg Symposium (IGARSS' 85), Amherst, MA, Oct. 7-9, 1985. Digest, Vol. 1. New York, Insti-tute of Electrical and Electronics Engineers, Inc., 1984 n. 87-91 1985, p.87-91. Gow, A.J., Stanton, T.K. 40-411

ICE ACOUSTICS, ICE BOTTOM SURFACE, SEA ICE, ACOUSTIC SCATTERING, ATTENUATION, REMOTE SENSING, ACOUSTIC MEAS-UREMENT.

An analysis has shown that: reflection coefficient for growing ice is about .06. This coefficient increases dramatically as the ice decays. A frequencies above 100 kHz, scattering is dominated by the dendrites at the base of the ice. Fluctuations in normal incidence echoes are significant above 100 kHz. Backscatter from the underside of sea ice does

not change significantly as the ice grows out of the meit (0 to 10 cm thick). Attenuation is found to be far greater than the attenuation reported by Langleben who performed measurements horizontally and away from the dendritic layer (same acoustic frequencies).

MP 1913 100 MHZ DIELECTRIC CONSTANT MEASURE-MENTS OF SNOW COVER: DEPENDENCE ON ENVIRONMENTAL AND SNOW PACK PARAM-

ETERS. B.A., et al, International Geoscience and Remote Sensing Symposium (IGARSS '85), Amherst, MA, Oct. 7-9, 1985. Digest, Vol. 2, New York, Institute of Electrical and Electronics Engineers, Inc., 1985, p.829-834, 3 refs.

Larson, R.W., Onstott, R.G., Fisk, D.J.

40-420
SNOW COVER DISTRIBUTION, SNOW ELECTRICAL PROPERTIES, REMOTE SENSING, MICROWAVES, DIELECTRIC PROPERTIES, SNOW DEPTH, SNOW WATER CONTENT, SURFACE ROUGHNESS, SNOW TEMPERATURE, SNOW DENSITY.

SNOW DENSITY.

Snow cover of both land and ocean (sea ice) areas presents a challenge to remote sensing. On one hand, it acts as a mask over surfaces of interest and part of the remote sensing problem is then to determine whether the snow cover is transparent, opaque, or partially transparent resulting in an ambiguous signature. On the other hand, the properties of the snow cover itself may be of interest, such as depth, anow water equivalent and coverage. Microwave remote sensors in particular have potential to monitor these properties because of their capabilities to penetrate the surface, detect small wetness differences and operate in all weather conditions (Foster, et al., 1985). To realize this potential, it is necessary to understand how snow properties affect remote sensing signatures. Microwave signatures of snow are a function of dielectric constant as well as surface roughness and depth. A primary objective therefore is to determine the relationship between the dielectric constant and environmental parameters, including physical properties of the snow cover and local meteorological variables.

MP 1914
ICE CONDITIONS ON THE OHIO AND IL-

LINOIS RIVERS, 1972-1985.
Gatto, L.W., International Geoscience and Remote Sensing Symposium (IGARSS '85), Amherst, MA, Oct. 7-9, 1985. Digest, Vol. 2, New York, Institute of Electrical and Electronics Engineers, Inc., 1985, p.856-861, 3 refs. 40-424

RIVER ICE, ICE CONDITIONS, ICE FORECAST-ING, REMOTE SENSING, MAPPING, AERIAL SURVEYS, UNITED STATES—OHIO RIVER, UNITED STATES—ILLINOIS RIVER.

MP 1915
SHEET ICE FORCES ON A CONICAL STRUCTURE: AN EXPERIMENTAL STUDY.
Sodhi, D.S., et al, Arctic Energy Technologies Workshop, Morgantown, WV, Nov. 14-15, 1984. Proceedings, U.S. Department of Energy, Morgantown Energy Technology Center, DOE/METC-85/6014, Apr. 1985, p.46-54, DE85003360, 11 refs. Morris, C.E., Cox, G.F.N. 40-644

ICE PRESSURE, OFFSHORE STRUCTURES, ICE LOADS, FLEXURAL STRENGTH, ICE COVER THICKNESS, ICE FRICTION, ICE SHEETS, SUR-FACE PROPERTIES, ICE MECHANICS, VELOCI-

Small-scale experiments were performed to determine sheet ice forces on a conical structure. The experiments were conducted with a 45 deg, upward-breaking conical structure which had diameters of 1.5 m at the waterline and 0.33 m at the top. The surface of the structure was initially amooth; later it was roughened to investigate the effect of surface friction on the ice load. The thickness and the flexural strength of ice sheets were varied, and the tests were conducted at three fixed velocities. The measured ice forces agree well with the forces predicted by plastic limit analysis. There is no effect of velocity on the ice forces for tests conducted for a low coefficient of friction (0.1), whereas some velocity effect on the horizontal ice forces are higher at lower velocities. The horizontal ice forces are higher at lower velocities. The size of the broken ice pieces, determined from a power spectrum analysis of the horizontal ice force records, was found to be about one-third of the characteristic length. Small-scale experiments were performed to determ

MEASURING MULTI-YEAR SEA ICE THICK-NESS USING IMPULSE RADAR.

NESS USING IMPULSE RADAR.

Kovaca, A., et al, Arctic Energy Technologies Workshop, Morgantown, WV, Nov. 14-15, 1984. Proceedings, U.S. Department of Energy, Morgantown Energy Technology Center, DOE/METC-85/6014, Apr. 1985, p.55-67, DE85003360, 6 refs. Morey, R.M. 40-645

ICE COVER THICKNESS, REMOTE SENSING, ICE BOTTOM SURFACE, ICE STRUCTURE, RADAR ECHOES, SEA ICE, ICE DETECTION, BRINES, ICE ELECTRICAL PROPERTIES.

BRINES, ICE ELECTRICAL PROPERTIES. Sounding of multi-year sea ice, using impulse radar operating in the 80- to 500-MHz frequency band, revealed that the bottom of this ice could not always be detected. It was found that the bottom of the ice could not be detected where the ice structure had a high brine content. Because of brine's high conductivity, brine volume dominates the loss mechanism in first-year sea ice, and the same was found true for multi-year sea ice, and the same was found true for multi-year sea ice is 3.5. This represents an effective EM wavelet velue for the apparent bulk dielectric constant of multi-year sea ice is 3.5. This represents an effective EM wavelet velocity of 0.16 m/ns, which may be used to estimate multi-year sea ice thickness in cases where the ice bottom is detected in ice profile data.

MP 1917 PRELIMINARY SIMULATION STUDY OF SEA ICE INDUCED GOUGES IN THE SEA FLOOR. Weeks, W.F., et al, Arctic Energy Technologies Workshop, Morgantown, WV, Nov. 14-15, 1984. Proceedings, U.S. Department of Energy, Morgantown Energy Technology Center, DOB/METC-85/6014, Apr. 1985, p.126-135, DE85003360, 16 refs. Tucker, W.B., Niedoroda, A.W

ICE SCORING, SEDIMENT TRANSPORT, OCEAN BOTTOM, BOTTOM TOPOGRAPHY, GRAIN SIZE, BOTTOM SEDIMENT, BEAUFORT

SEA. A simulation model for sea ice-induced gouges on the shelf of the Beaufort Sea is developed by assuming that the annual occurrence of new gouges is given by a Poisson distribution, the locations of the gouges are random, and the distribution of gouge depths is specified by an exponential distribution. Once a gouge is formed it is subject to infilling by transport of sediment into the region and by local movement of sodiment along the sea floor. These processes are modeled by assuming a sediment input based on stratigraphic considerations and by calculating bod-load transport using methods from sediment transport theory. It is found that if currents are sufficient to transport sediment, rapid infilling of gouges occurs. In that these threshold currents are small for typical grain sizes on the Beaufort Shelf, this suggests that the gouging record commonly represents only a few tens of years.

MP 1918
MAPPING RESISTIVE SEABED FEATURES
USING DC METHODS.

Workshop, Morgantown, WV, Nov. 14-15, 1984. Proceedings, U.S. Department of Energy, Morgantown Energy Technology Center, DOE/METC-85/6014, Apr. 1985, p.136-147, DE85003360, 6 refs. Delaney, A.J., Arcone, S.A. 40-652

SUBSEA PERMAFROST, OCEAN BOTTOM, BOTTOM SEDIMENT, SOIL STRENGTH, ELECTRIC EQUIPMENT, MAPPING, MODELS.

TRIC EQUIPMENT, MAPPING, MODELS.
Geophysical field observations of apparent resistivity using Wenner and dipole-dipole electrode arrays were made at several New England coastal sites The objective was to assess the performance of these systems in detecting resistive seabed features as an indication of their potential for subsea permafrost mapping. Two sites on the Maine coast were used for observations on bedrock below a thin layer of sediments. A seaborne survey was then conducted in New Haven Harbor, Connecticut, at a site where the depth to bedrock below the seabed had been mapped by seismic methods and drilling several years earlier (U.S. Army Corps of Engineers 1981). The data gathered helped to define the range of apparent resistivity values expected in areas of subsea permafrost, the effect of water depth on the quality of a survey, and the vertical and lateral resolution capabilities of the arrays used. Good qualitative agreement between rock depth and resistivity was observed, even with rock deptha up to 50 m below the seabed. Data were also collected in areas where seismic methods had been unable to extract subbottom information due to the gas content of local organic sediments.

MP 1919
RECONSIDERATION OF THE MASS BALANCE
OF A PORTION OF THE ROSS ICE SHELF, ANTARCTICA.

A lowered of electology. 1984, 30(106),

Jezek, K.C., et al, Journal of glaciology, 1984, 30(106), p.381-384, 6 refs., With French and German sum-

Bentley, C.R.

ICE SHELVES, GROUNDED ICE, MASS BALANCE, ANTARCTICA—ROSS ICE SHELF.

ANCE, ANTARCTICA—ROSS ICE SHELF.

The identification of a small region of grounded ice in the north-western sector of the Ross Ice Shelf has forced a re-evaluation of the mass-balance calculations carried out by Thomas and Bentley (1978). Those authorn concluded that the Ross Ice Shelf up-stream of Crary Ice Rise was thickening, but they did not take into account the effects on the velocity field of grounded ice which is located near the input gate to their volume element. Reasonable estimates of the despect to which the ice velocity interturent. the input gate to their volume element. Reasonable estimates of the degree to which the ice velocity just up-stream of the grounded ice is diminished indicate that it is no longer possible to conclude that the ice shelf is thickening using Thomas and Bentley's original flow band. Therefore, a new flow band was chosen which was grid east of Thomas and Bentley's band and unaffected by any nearby grounded areas. The mass balance in this flow band was found to be zero within experimental error; a difference exceeding about 0.2 m/s in magnitude between the thickening and bottom freeze-on rates is unlikely. (Auth.)

MP 1920 PREFERENTIAL DETECTION OF SOUND BY PERSONS BURIED UNDER SNOW AVA-LANCHE DEBRIS AS COMPARED TO PER-SONS ON THE OVERLYING SURFACE.

Johnson, J.B., International Snow Science Workshop, Aspen, CO, Oct. 24-27, 1984. Proceedings, Aspen, CO, ISSW Workshop Committee, [1984], p.42-47, 8 refs. 40-801

RESCUE OPERATIONS, AVALANCHE DEPOSITS, DETECTION, SNOW ACOUSTICS, SNOW COVER EFFECT, SOUND WAVES, ATTENUA-

TION.

The preferential detection of sound by a person buried under snow can be explained by the strong attenuation of acoustic waves in snow and the relatively higher level of background acoustic noise that exist for persons above the snow surface as compared to an avalanche burial victim. This noise masks sound transmitted to persons on the snow surface causing a reduction of hearing sensitivity as compared to the burial victim. Additionally, the listening concentration of a buried individual is generally greater than for persons working on the snow surface, increasing their subjective awareness of sound.

MF 1921 NEW CLASSIFICATION SYSTEM FOR THE SEASONAL SNOW COVER. Colbeck, S.C., international Snow Science Workshop, Aspen, CO, Oct. 24-27, 1984. Proceedings, Aspen, CO, ISSW Workshop Committee, [1984], p.179-181, 3 refs. 40-825

40-825
SNOW CRYSTAL STRUCTURE, METAMORPHISM (SNOW), SNOW WATER CONTENT,
FREEZE THAW CYCLES, CLASSIFICATIONS,
ICE CRYSTAL GROWTH, SNOW MELTING,
SNOW COVER, GRAIN SIZE.

SNOW COVER, GRAIN SIZE.

It is necessary to assign terms to snow crystals so that we can refer to them at any time. TCSI (1954) suggested five classes of snow crystals but many important types of crystals were not included. Sommerfield (1969) and then Sommerfield and LaChapelle (1970) suggested a classification based on processes because, if the processes could be correctly identified, information would be provided about both crystal shapes and metamorphic processes. Unfortunately, many of the names used—equitemperature, temperature gradient, and melt-freeze—can misrepresent the processes responsible for generating those shapes. Other terms are suggested here in hopes of correctly describing anow crystals. Only the major categories are dealt with here; a more detailed classification will be published later.

REVIEW OF ANALYTICAL METHODS FOR GROUND THERMAL REGIME CALCULA-

Lunardini, V.J., Thermal design considerations in frozen ground engineering. Edited by T.G. Krzewinski and R.G. Tart, Jr., New York, NY, American Society of Civil Engineers, 1985, p.204-257, 33 refs.

PERMAFROST THERMAL PROPERTIES, FROZ-PERMAPROST THERMAL PROPERTIES, FROZ-EN GROUND TEMPERATURE, THERMAL REGIME, HEAT TRANSFER, STRUCTURES, HEAT BALANCE, PHASE TRANSFORMA-TIONS, STEFAN PROBLEM, ANALYSIS (MATH- MP 1923

THAWING OF PROZEN CLAYS.

Anderson, D.M., et al, Freezing and thawing of soil-water systems. Edited by D.M. Anderson and P.J. water systems. Edited by D.M. Anderson and P.J. Williams, New York, NY, American Society of Civil Engineers, 1985, p.1-9, 11 refs.

Tice, A.R. 40-612

GROUND THAWING, CLAYS, SOIL WATER MI-GRATION, GROUND ICE, ICE NUCLEI, POR-OUS MATERIALS, LATENT HEAT, UNFROZEN WATER CONTENT, ICE CRYSTALS, TEMPERA-TURE EFFECTS, PHASE TRANSFORMATIONS.

MP 1924 PARTIAL VERIFICATION OF A THAW SETTLE-MENT MODEL.

Guymon, G.L., et al, Freezing and thawing of soil-water systems. Edited by D.M. Anderson and P.J. Williams, New York, NY, American Society of Civil Engineers, 1985, p.18-25, 6 refs. Berg, R.L., Ingersoil, J. 40-614

GROUND THAWING, SETTLEMENT (STRUCTURAL), HEAT TRANSFER, MOISTURE TRANSFER, FROST HEAVE, FREEZE THAW CYCLES, MODELS, THAW WEAKENING,

Results from a one-dimensional model that estimates frost heave and thaw settlement are compared to laboratory soil column data. The model is based upon well known equations that describe heat and moisture flow in soils. Processes in freezing or thawing zones are approximated by a lumped isothermal heat budget approach as well as phenomenological equations that account for overburden effects and reduced fluid movement due to ice formation. Laboratory soil column data were obtained for one-dimensional freezing and then thawing of a sit soil. The model results accurately estimate temperature distributions and pore water pressures during thawing.

MP 1925 HYDRAULIC PROPERTIES OF SELECTED

Ingersoll, J., et al, Freezing and thawing of soil-water systems. Edited by D.M. Anderson and P.J. Williams, New York, NY, American Society of Civil Engineers, 1985, p.26-35, 4 refs.

Berg, R.L. 40-615

SOIL WATER, FROST HEAVE, SETTLEMENT (STRUCTURAL), FREEZE THAW CYCLES, PAVEMENTS, TENSILE PROPERTIES, SOIL STRUCTURE, GRAIN SIZE, MATHEMATICAL MODELS.

The method and equipment used to coincidentally determine the hydraulic conductivity versus soil moisture tension and soil moisture tension not represent the soil moisture tension not result to the soil to the versus soil to the versus soil and the soil to the versus the been conducted at soil moisture tensions less than 100 kPa (1 bar), but a few moisture retention curves extend to about 12 bars of soil moisture retention. Results for one soil from each type are described and discussed in detail. Grain size distributions and the two hydraulic relationships are shown for each of the four soils. An equation suggested by Gardner is used to approximate both relationships. Coefficients for Gardner's equations for several different soils have been obtained and are tabulated. The method and equipment used to coincidentally determ

MP 1926 MODEL FOR DIELECTRIC CONSTANTS OF FROZEN SOILS.

Oliphant, J.L., Freezing and thawing of soil-water systems. Edited by D.M. Anderson and P.J. Williams, New York, NY, American Society of Civil Engineers, 1985, p. 46-57, 17 refs.

FROZEN GROUND PHYSICS, SOIL COMPOSITION, GROUND THAWING, UNFROZEN WATER CONTENT, DIELECTRIC PROPERTIES, TEMPERATURE EFFECTS, NUCLEAR MAGNETIC RESONANCE.

The dielectric constant of frozen soils is made up of contributions from each phase—mineral, ice, air and liquid water—in the soil. The apparent dielectric constants of three soils, a kaolinite, Morin clay and Palouse silt-loam, were measured under both thawed and frozen conditions at various temperatures and various water contents using time domain reflectometry (TDR). Nuclear magnetic resonance (NMR) was used to measure the unfrozen water contents of these soils at subfreezing temperatures. The NMR data were used to calculate the volume fractions of the ice and liquid water phases in the TDR experiments. It was found that a mixing model for the apparent dielectric constant of the soil samples assuming spherical sir, ice and minderal inclusions in a water matrix was able to closely fit the TDR data. To obtain the best fit it was necessary to use an average dielectric constant for water somewhat less than that for bulk water. The mixing model can be used for the interpretation of TDR data obtained in the field.

This allows for the measurement of unfrozen water contents using TDR at temperatures just below 0 C, where the liquid water phase makes up a significant portion of the TDR

MP 1927 FROST HEAVE OF FULL-DEPTH ASPHALT CONCRETE PAVEMENTS.

Zomerman, I., et al, Freezing and thawing of soil-water systems. Edited by D.M. Anderson and P.J. Wil-liams, New York, NY, American Society of Civil Engi-neers, 1985, p.66-76, 12 refs.

neers, 1985, p.66-76, 12 reis.

Berg, R.L.

40-619

FROST HEAVE, PAVEMENTS, BITUMINOUS
CONCRETES, THAW WEAKENING, SOIL WATER, SOIL STRUCTURE, FROST PENETRATION, GRAIN SIZE, TESTS, HEAT TRANSFER,
MOISTURE TRANSFER, FROST REISTANCE. MOISTURE TRANSFER, FROST RESISTANCE. During 1984 and early 1985 frost penetration, frost heave and thaw weakening were monitored on two full-depth test sections at CRREL. The subgrade soil beneath one test section was a lean clay and the subgrade soil beneath the second test section was Hanover silt. Laboratory frost susceptibility tests were conducted for each soil, as were moisture retention curves and curves relating moisture content and unasaturated hydraulic conductivity. Results from the laboratory tests were used with FROSTIB, a coupled heat and mass flow computer model, to simulate performance of the field test sections. FROSTIB had never been applied to a cohesive soil similar to the lean clay. Results from model simulations on both soils agreed well, i.e. within about 15% with field measurements of frost heave and frost penetration with time.

MP 1928

penetration with time.

CREEP STRENGTH, STRAIN RATE, TEMPERA-TURE AND UNFROZEN WATER RELATION-SHIP IN FROZEN SOIL.

Fish, A.M., International Symposium on Ground Freezing, 4th, Sapporo, Japan, Aug. 5-7, 1985. Proceedings, Vol.2, [Rotterdam, A.A. Balkema, 1985], p.29-36, 32 refs. 40-661

FROZEN GROUND STRENGTH, SOIL CREEP, STRAINS, FROZEN GROUND TEMPERATURE, UNFROZEN WATER CONTENT, FROZEN GROUND PHYSICS, COMPRESSIVE PROPERTIES, TEMPERATURE EFFECTS, ANALYSIS TIES, TEMPERAT (MATHEMATICS).

(MATHEMATICS).

A relationship was developed between maximum (peak) strength, strain rate, strain, and temperature using data on uniaxial compression of remolded frozen Fairbanks silt obtained in the temperature range from -0.5 to -10 C at constant strain rates (CSR) that varied between 1/100 and 1/1,000,000/s. It is shown that three principal parameters of frozen soil define the magnitude of strength at a given strain rate: the instantaneous strength, the activation energy, and the strain hardening parameter all relate to each other. Their absolute values depend upon temperature and are linked with the simplest physical characteristics of soil and especially the ice and unfrozen water contents. The activation energy with the simplest physical characteristics of soil and especially the ice and unfrozen water contents. The activation energy of frozen soil is presented as a sum of two components: activation energy of the soil skeleton and activation energy of the unfrozen water. The activation energy of frozen soil varied due to the changes of unfrozen water content between 16.6 and 13.2 kcal/mole.

PREDICTION OF UNFROZEN WATER CON-TENTS IN FROZEN SOILS BY A TWO-POINT OR ONE-POINT METHOD.

Xu, X., et al, International Symposium on Ground Freezing, 4th, Sapporo, Japan, Aug. 5-7, 1985. Pro-ceedings, Vol.2, (Rotterdam, A.A. Balkema, 1985), p.83-87, 5 refs. Oliphant, J.L., Tice, A.R.

40-669

FROZEN GROUND, UNFROZEN WATER CON-TENT, DENSITY (MASS/VOLUME), TEMPERATURE EFFECTS.

TURE EFFECTS.

The unfrozen water content in frozen soils, with different initial water content, dry density and molality, was determined by the nuclear magnetic resonance technique. Results show that the unfrozen water content in frozen morin clay changes with the initial water content and the dry density only within a range of three percent of the dry soil weight, and increase with the increase in the molality linearly because of the linear freezing point depression. The curves of the unfrozen water content vs temperature are quite parallel with the change in the initial water content and rotate a little bit counterclockwise with the increase in the dry density. On the basis of the data mentioned above, a two-point method by the measurements of two freezing points at two different initial water contents, and a one-point method by the measurement of the unfrozen water content at 1 C if the initial water content and its freezing point are given, is presented.

Errors of predicting the unfrozen water content are 1-3% on the average for the two-point method and 1% or so for the one-point method.

FROST JACKING FORCES ON H AND PIPE PILES EMBEDDED IN PAIRBANKS SILT.

Johnson, J.B., et al, International Symposium on Ground Freezing, 4th, Sapporo, Japan, Aug. 5-7, 1985. Proceedings, Vol.2, Rotterdam, A.A. Balkema, 1985, p. 125-133, 5 refs. Each, D.C.

BACH, D.C.
40-676
PROST HEAVE, PILE EXTRACTION, PIPELINE
SUPPORTS, SHEAR STRESS, PERMAFROST
DISTRIBUTION, FOUNDATIONS, TEMPERATURE EFFECTS, FROZEN GROUND MECHAN-FROST PENETRATION, COUNTERMEAS-LIRES

URES.
The magnitude and variation of forces and shear stresses, caused by soil frost heaving, for a pipe pile and an H pile were determined as a function of depth along the upper 3 m of the piles for two consecutive winters. The maximum frost heaving forces on the H pile during each winter were 943 kN and 899 kN.

The maximum frost heaving force on the pipe pile was 703 kN.

Maximum local shear stresses for the H pile were 1 MPa and 903 kPa for the pipe pile was 896 kPa.

Maximum local shear stress for the pipe pile was 896 kPa.

Maximum average shear stresses over the two winters were 324 kPa and 427 kPa for the H pile and 324 kPa for the pipe pile.

Maximum heaving forces and shear stresses occurred during periods of maximum cold and soil surface heave magnitude. These were not related to the depth of frost for most of the winter since the soil was frozen completely to the permafrost table.

MP 1931

SHEAR STRENGTH ANISOTROPY IN FROZEN SALINE AND FRESHWATER SOILS.

Chamberlain, E.J., International Symposium on Ground Preezing, 4th, Sapporo, Japan, Aug. 5-7, 1985. Proceedings, Vol.2, Rotterdam, A.A. Balkema, 1985, p.189-194, 2 refs. 40-687

FROZEN GROUND STRENGTH, SHEAR STRENGTH, ANISOTROPY, SALINITY, CLAY SOILS, SANDS, TESTS.

SOILS, SANDS, TESTS.

The shear strength anisotropy of frozen freshwater and seawater clay and sand soils was investigated using the direct shear technique. Samples were sheared at angles of 0, 30, 60 and 90 degrees between the shear and freezing planes. Because of variations in sample density, there was considerable scatter in the data. This scatter and the relationship of the maximum shear strength to the angle between the shear and freezing planes were accounted for by conducting multiple linear regression analysis on empirical equations relating the test variables to the shear strength.

SOIL-WATER POTENTIAL AND UNFROZEN WATER CONTENT AND TEMPERATURE.

Xu, X., et al, Journal of glaciology and geocryology, 1985, 7(1), p.1-14, 8 refs., In Chinese with English

Oliphant, J.L., Tice, A.R.

PROZEN GROUND TEMPERATURE, NU-CLEAR MAGNETIC RESONANCE, UNFROZEN WATER CONTENT, SOIL WATER, SOIL STRUC-TURE, WATER CONTENT, FREEZING POINTS, SOIL CHEMISTRY, SOIL TEMPERATURE, DEN-SITY (MASS/VOLUME).

SITY (MASS/VOLUME).

Soil-water potential was determined by the extraction method and four factors affecting the soil-water potential, including water content, soil type, dry density and temperature, were investigated. The unfrozen water content of frozen soils was determined by the pulsed nuclear magnetic resonance technique and three factors affecting the unfrozen water content, including initial water content, dry density and salt concentration, were investigated. Results have shown that the soil-water potential in the unsaturated, unfrozen soils decreases both with the decrease in the water content and with the increase in the dispersion of the soil and increases with the increase in the dry density and temperature. The unfrozen water content and the dry density within the initial water content and the dry density whith the initial water content and the dry density whith the increase in the salt concentration.

MED 1932

MP 1933

EFFECTS OF SOLUBLE SALTS ON THE UN-FROZEN WATER CONTENTS OF THE LANZ-HOU, PR.C, SILT.

Tice, A.R., et al, Journal of glaciology and geocryology, June 1985, 7(2), p.99-109, In Chinese with English summary, 20 refs. For English version see 39-2916.

Zhu, Y., Oliphant, J.L. 40-830

UNFROZEN WATER CONTENT, FROZEN GROUND PHYSICS, SALINE SOILS, ELECTRI-CAL RESISTIVITY, SOIL CHEMISTRY.

Phase composition curves are presented for a typical saline silt from Lanzhou and compared to some silts from Alaska. The unfrozen water content of the Chinese silt is much higher than the Alaskan silts. This higher amount is

due to the large amount of soluble salts present in the silts from China which are not present in the silts from interior Alesta. When the salts are removed, the unfrozen water contents are then similar for the Chinese and Alaskan silts. We have introduced a technique for correcting the unfrozen water content of partially frozen solid due to high salt concentrations. This correction is possible by calculating the modelity of the unfrozen water at each temperature from a measurement of the electrical conductivity of the extract of a saturated paste.

MP 1934 WATER MIGRATION IN UNSATURATED FROZEN MORIN CLAY UNDER LINEAR TEM-PREATURE GRADIENTS.

Xu, X., et al, Journal of glaciology and geocryology, June 1985, 7(2), p.111-122, 14 refs., In Chinese with **English summer**

Oliphant, J.L., Tice, A.R. 40-831

SOIL WATER MIGRATION, CLAY SOILS, FROZEN GROUND PHYSICS, SATURATION, TEMPERATURE GRADIENTS.

MP 1935

PRESSURE RIDGE MORPHOLOGY AND PHYSICAL PROPERTIES OF SEA ICE IN THE GREENLAND SEA.

Tucker, W.B., et al, Arctic Oceanography Conference and Workshop, Hattiesburg, MS, June 11-14, 1985. Proceedings, U.S. Department of the Navy, 1985, p.214-223, 13 refs. Gow, A.J., Weeks, W.F.

40-957

40-957
PRESSURE RIDGES, ICE STRUCTURE, ICE
PHYSICS, SEA ICE, SALINITY, GROUNDED
ICE, ICE CRYSTAL STRUCTURE, ICE FLOES,
GREENLAND SEA.

GREENLAND SEA.
Field investigations of pressure ridge sails have shown that ridge beight is limited by the thickness of the ice that deformed. Sail height and width can be conveniently expressed as functions of the thickness of the ice blocks contained in the ridge. Surface dimensions of the blocks are also related to ice thickness. Ridge height may be determined by the shilty of the parent sheet to support the loading imposed by the ridge or by the type of failure occurring. Some insight into the structure of ridge keels may result from detailed study of the sails. The physical properties of sea ice in the Fram Strait region of the Greenland Sea were examined as part of the MIZEX field program in 1984. The properties measured at each sampling site included salinity, temperature, thickness, crystal structure and snow depth. The measured salinities agreed well with those measured elsewhere in the Arctic during summer. Crystal extructure analysis indicated that about 75% of the ice consisted of columnar type crystal structure. The remaining 25% consisted of granular ice.

MP 1936

MP 1936 MECHANICAL PROPERTIES OF MULTI-YEAR PRESSURE RIDGE SAMPLES.

PRESSURE RIDGE SAMPLES.

Richter-Menge, J.A., Arctic Oceanography Conference and Workshop, Hattiesburg, MS, June 11-14, 1985. Proceedings, U.S. Department of the Navy, 1985, p.244-251, 19 refs.

40-960

PRESSURE RIDGES, ICE MECHANICS, COM-PRESSIVE PROPERTIES, TENSILE PROPER-TIES, ICE DENSITY, MECHANICAL TESTS, SALINITY

SALÍNITY.

Over 500 laboratory tests have recently been completed on ice samples collected from multi-year pressure ridges in the Alaskan Beaufort Sea. Tests were performed in uniaxial constant-terian-rate compression and tension and in confined compression. The tests were conducted at two temperatures, -5 and -20 C, and four strain rates ranging from 1/100 to 1/100,000/s. This discussion summarizes the sample preparation and testing techniques used in the investigation and presents data on the compressive, tension and confined compressive strength of multi-year ridge samples. This information is necessary for designing arctic structures and vessels that must withstand the impact of a multi-year pressure ridge.

MMP 1837

EXPERIENCE WITH A BIAXIAL ICE STRESS SENSOR.

Cox, G.F.N., Arctic Oceanography Conference and Workshop, Hattiesburg, MS, June 11-14, 1985. Pro-ceedings, U.S. Department of the Navy, 1985, p.252-258, 10 refs. 40-961

ICE PRESSURE, ICE STRENGTH, STRESSES, LOADS (FORCES), OFFSHORE STRUCTURES, ICE MECHANICS, ICE LOADS, TESTS, SEA ICE, ICE NAVIGATION

A biaxial ice stress sensor has been developed to measure the magnitude and direction of the principal stresses in an ice sheet. Controlled laboratory tests indicate that the sensor has a resolution of 20 kPs and an accuracy of better than 10% under a variety of loading conditions. The sensor has been successfully used to measure thermal ice pressures in lakes and ice loads on a caisson-retained island in the Beaufort Sea.

MP 1938

NUMERICAL SIMULATION OF SEA ICE IN-DUCED GOUGES ON THE SHELVES OF THE POLAR OCEANS.

Works, W.F., et al, Arctic Oceanography Conference and Workshop, Hattiesburg, MS, June 11-14, 1985. Proceedings, U.S. Department of the Navy, 1985, p.259-265, 16 refs. Tucker, W.B.

40-962

40-962
ICE SCORING, COMPUTER PROGRAMS,
MATHEMATICAL MODELS, ICE SHELVES,
SEA ICE, SEDIMENT TRANSPORT, OCEAN
BOTTOM, DISTRIBUTION, STATISTICAL
ANALYSIS, STRATIGRAPHY, OCEAN CUR-RENTS

RENTS.

A simulation model for sea ice-induced gouges on the shelves of the polar seas is developed by assuming that the annual occurrence of new gouges is given by a Poisson distribution, the locations of the gouges are random, and the distribution of gouge depths is specified by an exponential distribution. Once a gouge is formed it is infilled by assuming a sediment input based on stratigraphic considerations and by calculating bed-load transport using methods from sediment transport theory. If currents are sufficient to transport sediment, rapid infilling of gouges occurs. In that these threshold currents are small for typical grain sizes, this suggests that the gouging record commonly represents only a few tens of years.

TEMPERATURE DEPENDENCE OF THE EQUI-LIBRIUM FORM OF ICE. Colbeck, S.C., Journal of crystal growth, Sep. 1985,

72(3), p.726-732, 25 refs. 40-981 ICE CRYSTAL GROWTH, ICE CRYSTAL STRUC-

TURE, SNOW CRYSTAL STRUCTURE, TEM-PERATURE EFFECTS, PLATES, SURFACE ROUGHNESS, EXPERIMENTATION.

ROUGHNESS, EXPERIMENTATION. Individual crystals are grown under controlled conditions at temperatures between -0.6 and -20 C at rates as low as 1/10,000,000. The transition between the kinetic growth form and the equilibrium form is clearly distinguished at temperatures between -2 and -10 C where the equilibrium form is a well-rounded plate with an aspect ratio of about 2.5. At temperatures below -11 C the equilibrium form is a hexagonal prism of about the same aspect ratio. This transition coincides with the rapid increase in surface roughening on the prism faces at temperatures above -10 C. The equilibrium form is a fully rounded particle just below C although we had expected the fully rounded particle to prevail down to at least -5 C. Purthermore, there are unresolved differences between these experimental results and observations of crystals from the seasonal snow cover where particles are fully rounded at slow growth rates and low temperatures.

ICE JAM FLOOD PREVENTION MEASURES: AMOILLE RIVER AT HARDWICK, VER-

MONT, USA.
Calkins, D.J., International Conference on the Hydraulics of Floods and Flood control, 2nd, Cambridge, England, Sep. 24-26, 1985. Proceedings, Cranfield, Bedford, England, BHRA, The Fluid Engineering Centre, 1985, p.149-168, 4 refs.

ICE CONTROL, ICE JAMS, RIVER ICE, FLOODS, WATER LEVEL, TOPOGRAPHIC EFFECTS, COUNTERMEASURES.

Prevention of ico-induced flooding is very difficult, but the impact can be minimized if the winter ice regime can be altered. The Lamoille River at Hardwick, Vermont, is a steep, shallow stream during non-ice periods. Under ice jam conditions stage increases of 1-2 m above the elevation of the floodplain have been measured. Several experimental measures have been implemented to minimize the ice jam flood levels; their performance was evaluated for the winter of 1983-84.

MP 1941

GEOPHYSICAL SURVEY OF SUBGLACIAL GEOLOGY AROUND THE DEEP-DRILLING SITE AT DYE 3, GREENLAND.

Jezek, K.C., et al, American Geophysical Union. Geophysical monograph series, 1985, No.33, p.105-110, 14 refs

Roeloffs, E.A., Greischar, L.L.

39-3573
GEOPHYSICAL SURVEYS, GLACIER BEDS, GLACIAL GEOLOGY, SUBGLACIAL OBSERVATIONS, BOREHOLES, TOPOGRAPHIC FEATURES, GEOMORPHOLOGY, RADAR ECHOES, TECTONICS, GREENLAND

MP 1942

SIMPLE DESIGN PROCEDURE FOR HEAT

TRANSMISSION SYSTEM PIPING.
Phetteplace, G.E., Intersociety Energy Conversion
Engineering Conference, 19th, San Francisco, CA,
Aug. 19-24, 1984. Proceedings. Vol.3, American
Nuclear Society, 1984, p.1748-1752, 4 refs. 40-1688

COST ANALYSIS, HEAT TRANSMISSION, PIPE-LINES, LOADS (FORCES), DESIGN, ANALYSIS (MATHEMATICS), HEATING, COOLING, HEAT LOSS.

Piping systems represent the major portion of the total cost of most district heating applications and constitute a barrier to their widespread implementation. This paper presents a methodology for least-cost design of these systems under realistic conditions of varying load. Cost-effective design of piping for district heating and cooling applications requires careful consideration of the various components of the owning and operating costs. These costs are included in the formulation of an optimization problem to determine the minimum cost design on a yearly cycle basis.

MP 1943

NITROGEN REMOVAL IN WASTEWATER STA-

BILIZATION PONDS.
Reed, S.C., (1983, 13p. + figs., Presented at 56th Annual Conference of the Water Pollution Control Federation, Atlanta, Georgia, Oct. 2-7, 1983. Unpublished manuscript. 14 refs. 40.1089. 4A-1089

WASTE TREATMENT, WATER TREATMENT, WATER POLLUTION, PONDS, COUNTER-MEASURES, DESIGN CRITERIA, LAND RECLAMATION, CHEMICAL ANALYSIS.

LAMATION, CHEMICAL ANALYSIS.

A rational procedure for estimating nitrogen removal in facultative wastewater stabilization ponds has been developed and validated.

The procedure, based on first order plug flow kinetics is dependent on pH, temperature and residence time.

The model was developed from extensive data obtained at four facultative ponds in various parts of the US. and was validated with independent data from five pond systems in the US. and Canada. The procedure should be useful whenever system design criteria require nitrogen removal or nitrification. It should be particularly heighful for the pond component of land treatment systems when nitrogen is the limiting design parameter.

MP 1944 PROBLEMS WITH RAPID INFILTRATION—A POST MORTEM ANALYSIS.

ROULEM ALVALUES.
Reed, S.C., et al., 1984, 17p. + figs., Presented at 57th Annual Conference of the Water Pollution Control Federation, New Orleans, LA, Oct. 1-4, 1984. Unpublished manuscript. 7 refs.
Crites, R.W., Wallace, A.T.

WATER TREATMENT, WASTE TREATMENT, SEEPAGE, GROUND WATER, DESIGN, COST ANALYSIS.

ANALYSIS.
Rapid infiltration is a reliable and cost effective technique for wastewater treatment. Over 300 municipal systems are in successful use in the United States. A few of the recently constructed systems have not satisfied all design expectations, particularly with respect to the amount of wastewater that can infiltrate within the time allowed. Correction of these problems often requires additional construction and increases costs but the cumulative effect is also to raise general concerns within the profession regarding the suitability and applicability of the basic concept. An analysis of the failures, and some of the problem systems was conducted and this paper will describe the results.

MP 1945 WEILANDS FOR WASTEWATER TREATMENT IN COLD CLIMATES.

IN COLD CLIMATES.
Reed, S.C., et al., [1984], 9p. + figs., Presented at Water Reuse Symposium, 3rd, San Diego, CA, Aug. 26-31, 1984. Unpublished manuscript. 13 refs. Bastian, R., Black, S., Khettry, R. 40-1087
WASTE TREATMENT, WATER TREATMENT, COLD WEATHER PERFORMANCE, WATER LEVEL, GROUND WATER, VEGETATION FACTORS, SATURATION.

DESIGN, OPERATION AND MAINTENANCE OF LAND APPLICATION SYSTEMS FOR LOW COST WASTEWATER TREATMENT.

Reed, S.C., [1983], 26p. + figs., Presented at Work-shop on Low Cost Wastewater Treatment, Clemson, SC, Apr. 19-21, 1983. Unpublished manuscript. 3

rens.
40-1088
WASTE TREATMENT, WATER TREATMENT,
SEEPAGE, VEGETATION FACTORS, DESIGN
CRITERIA, LAND RECLAMATION, SATURA-

MP 1947 INCIDENTAL AGRICULTURE REUSE AP-PLICATION ASSOCIATED WITH LAND TREATMENT OF WASTEWATER—RESEARCH

NEEDS.

Read, S.C., Environmental Engineering Research Council Workshop—Water Conservation and Reuse in Industry and Agriculture: Research Needs, Kiawah Island, South Carolina, Mar. 3-6, 1982. Proceedings, New York, NY, American Society of Civil Engineers, 11922. p. 01-173. 24 sefts.

(1982, p.91-123, 34 refs. 40-1091
WASTE TREATMENT, WATER TREATMENT, LAND RECLAMATION, SEEPAGE, AGRICULTURE, VEGETATION, IRRIGATION, DESIGN, WATER POLLUTION, COUNTERMEASURES.

MP 1948 ENGINEERING SYSTEMS.

Loehr, R., et al, Workshop on Utilization of Municipal Wastewater and Sludge on Land, 1983. Proceedings. Edited by A.L. Page, L. Gleason, III, J.E. Smith, Jr., I.K. Iskandar, and L.E. Sommers, Riverside, Univer-sity of California, 1983, p.409-417, Includes discus-Reed. S.C.

WASTE TREATMENT, WATER TREATMENT, SLUDGES, LAND RECLAMATION, WATER POLLUTION, COUNTERMEASURES.

MAINTAINING FROSTY FACILITIES

Reed, S.C., et al, Operations forum, Feb. 1985, p.9-15,

Niedringhaus, L.

WASTE TREATMENT, WATER TREATMENT, COLD WEATHER OPERATION, MUNICIPAL ENGINEERING, MAINTENANCE, FLOW MEASUREMENT, SEDIMENTATION, DAM-AGE, SLUDGES.

MP 1950

GROWTH AND FLOWERING OF COTTON-GRASS TUSSOCKS ALONG A CLIMATIC TRAN-SECT IN NORTHCENTRAL ALASKA.

Haugen, R.K., et al., Arctic Workshop, 13th, Boulder, CO, Mar. 15-17, 1984. Proceedings, Boulder, University of Colorado, Institute of Arctic and Alpine Research, 1984, p.10-11, 2 refs. Shaver, G.R., King, G.G.

40-1107

HUMMOCKS, PLANT PHYSIOLOGY, GROWTH, CLIMATIC FACTORS, AIR TEMPERATURE, PRECIPITATION (METEOROLOGY), PIPE-LINES, ALTITUDE, UNITED STATES—ALAS-

DIELECTRIC STUDIES OF PERMAPROST USING CROSS-BOREHOLE VHF PULSE PROPAGATION.

PRUPAGATION.

Arcone, S.A., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1985, No.85-05, Workshop on Permafrost Geophysics, Golden, Colorado, Oct. 23-24, 1984. Proceedings, p.3-5, ADA-157 485, 1 ref.

Delaney, A.J.

40-1290

PERMAPROST PHYSICS, DIELECTRIC PROP-BRTIES, BOREHOLES, GROUND ICE, ELEC-TROMAGNETIC PROPERTIES, RADAR BCHOES, WAVE PROPAGATION, SOIL STRUC-TURE, PERMAPROST THERMAL PROPERTIES.

MP 1952

IMPULSE RADAR SOUNDING OF FROZEN GROUND.

uskUUND.

Kovacs, A., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1985, No.85-05, Workshop on Permafroat Geophysics, Golden, Colorado, Oct. 23-24, 1984. Proceedings, p.28-40, ADA-157 485, 1 ref. Morey, R.M.

40-1295

FROZEN GROUND PHYSICS, RADAR ECHOES, GROUND ICE, ICE DETECTION, SOUNDING, PIPELINES, PINGOS, ELECTROMAGNETIC PROSPECTING, ICE VOLUME

MP 1953 ANALYSIS OF WIDE-ANGLE REFLECTION

ANALYSIS OF WIDE-ANGLE REFLECTION AND REFRACTION MEASUREMENTS.
Morey, R.M., et al, U.S. Army Cold Regions Research and Bagineering Laboratory. Special report, May 1985, No.85-05, Workshop on Permafrost Geophysics, Golden, Colorado, Oct. 23-24, 1984. Proceedings, p.53-60, ADA-157 485, 6 refs.

Kovaca, A. 40-1299

RADAR ECHOES, SUBSURFACE INVESTIGA-TIONS, DIELECTRIC PROPERTIES, REFLEC-TION, REFRACTION, MATHEMATICAL MOD-ELS, WAVE PROPAGATION.

MP 1954

Some aspects of interpreting seismic DATA FOR INFORMATION ON SHALLOW SUBSEA PERMAPROST.

Neave, K.G., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1985, No.85-05, Workshop on Permafrost Geophysics, Golden, Colorado, Oct. 23-24, 1984. Proceedings, p.61-65, ADA-157 485, 6 refs. Sellmann, P.V. 40.1300.

40-1300

SUBSEA PERMAFROST, SEISMIC SURVEYS, PERMAFROST DISTRIBUTION, SEISMIC REFRACTION, SEISMIC VELOCITY, PERMA-FROST DEPTH.

MP 1955

GALVANIC METHODS FOR MAPPING RESIS-

TIVE SEABED FEATURES.
Sellmann, P.V., et al, U.S. Army Cold Regions Reseumann, r.v., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, May 1985, No.85-05, Workshop on Permafrost Geophysics, Golden, Colorado, Oct. 23-24, 1984. Proceedings, p.91-92, ADA-157 485. Delaney, A.J., Arcone, S.A. 40-1305

SUBSEA PERMAFROST, PERMAFROST PHY-SICS, GROUND ICE, CABLES (ROPES), MAP-PING, SEA WATER, SALINITY.

MP 1956

HEAT TRANSMISSION WITH STEAM AND HOT WATER.

Aamot, H.W.C., et al, Cogeneration district heating applications. Edited by I. Oliker, New York, American Society of Mechanical Engineers, 1978, p.17-23, Presented at the Winter Annual Meeting of the American Society of Mechanical Engineers, San Francisco, California, December 10-15, 1978. 6 refs. Phetteplace, G.

HEAT TRANSMISSION, WATER PIPES, WATER TEMPERATURE, FLUID FLOW, HEAT FLUX, HEAT LOSS, FLOW RATE, METEOROLOGICAL FACTORS, PRESSURE, COMPUTER APPLICATIONS, DESIGN.

TIONS, DESIGN.

A methodology for design of heat transmission lines is presented. It is bessed on finding the pipe diameter which yields the lowest total cost. Cost factors considered are cost of energy lost in the form of heat, cost of energy to produce pumping work, and cost of capital to construct the system. The methodology has been developed into a computer code which allows for rapid analysis of alternatives. Results are presented, based on certain assumptions, for various parameters of interest.

MP 1957

THEORY OF NATURAL CONVECTION IN SNOW.

Powers, D., et al, Journal of geophysical research, Oct. 20, 1985, 90(D6), p.10,641-10,649, 31 refs. O'Neill, K., Colbeck, S.C.

THEORIFS.
Buoyancy-driven flows of air in snow are modeled including the effects of phase change and inclination. Phase change between water vapor and ice is important because of latent heat terms in the energy equation. Upper boundaries of the snow are taken as either permeable or impermeable, with temperature or heat flux specified at the lower boundary. When the ratio of thermal to mass diffusivity is greater than 1, phase change intensifies convection. When this ratio is less than 1, phase change damps convection. The effects of permeable top and uniform heat flux bottom boundary conditions on beat transfer are quantified and described as linear functions of Ra/Ra(cr), where Ra is the Rayleigh number and or refers to the critical value for the onset of Benard convection. The slope of each function depends only on the thermal boundary condition at the lower boundary. If a snow cover is inclined, Rayleigh convection occurs

for any nonzero Rayleigh number. Velocity profiles for flows in inclined layers with permeable tops are derived, and it is found that velocity is proportional to Ra sin plit, where phi is the angle of inclination from the horizontal. The numerical results for different boundary conditions compare reasonably well with experimental results from the literature.

MP 1958

FORWARD-SCATTERING CORRECTED EX-TINCTION BY NONSPHERICAL PARTICLES. Bohren, C.F., et al. Applied optics, Apr. 1, 1985, 24(7) p.1023-1029, For another source see 39-2966. refs. Koh, G.

SNOWFLAKES, LIGHT SCATTERING, SNOW CRYSTAL STRUCTURE, PARTICLES, ICE NEE-DLES, ANALYSIS (MATHEMATICS).

DLES, ANALYSIS (MATHEMATICS).

Measured extinction of light by particles, especially those larger than the wavelength of the light illuminating them, must be corrected for forward-scattered light collected by the detector. Near-forward scattering by arbitrary nonspherical particles is, according to Fraunhofer diffraction theory, more sharply peaked than that by spheres of equal projected area. The difference between scattering by a nonspherical particle and that by an equal-area sphere is greater the more diffracely the particle's projected area is distributed about its centroid. Snowlakes are an example of large atmospheric particles that are often highly nonspherical Calculations of the forward-scattering correction to extinction by ice needles have been made under the assumption that they can be approximated as randomly oriented prolate apheroids (aspect ratio 10:1). The correction factor can be as much as 20% less than that for equal-area spheres depending on the detector's acceptance angle and the wavelength. Randomly oriented oblate-spheroids scatter more nearly like equal-area spheres. area spheres.

MP 1959

PEBBLE FABRIC IN AN ICE-RAFTED DIAMIC-TON.

Domack, E.W., et al, *Journal of geology*, Sep. 1985, 93(5), p.577-591, Refs. p.589-591.

Lawson, D.E. 40-1222

ICE RAPTING, GLACIAL DEPOSITS, SEDIMENTATION, MORAINES, STRATIGRAPHY, FOS-SILS, ORIGIN, GLACIER FLOW.

SILS, ORIGIN, GLACIER FLOW.

Pebble fabric studies on ice-rafted diamictons have been limited to general observations, with authors noting preferences toward vertical, random, or horizontal orientations. To clarify such observations, pebble fabric data were collected from a fossiliferous diamicton of late Pleistocene age located on Whidbey Island, Washington. The ice-rafted origin of this unit is supported by several independent characteristics including in situ macrofauna and microfauna, conformity with subsequeous lithofacies containing dropstones, lower bulk densities and higher void ratios than associated tills, soft sediment deformation structures suggestive of iceberg dumping, textural gradations, and facies relationships. Analysis using the eigenvalue method indicates that ice-rafted fabrics are nearly random with little consistency of vector orientations the eigenvalue method indicates that ice-rafted fabrics are nearly random with little consistency of vector orientations between sites and without any relationship to the probable direction of glacial flow. The weak fabric is mainly the product of settling through the water column and impact with, or penetration of, the bed. Samples that possess a weak preferred long axis orientation with a low angle of dip, including those from laminated muds, can best be explained by the intermittent effects of bottom currents, a resistant substrate at the time of deposition and postexplained by the intermittent effects of bottom currents, areaistant substrate at the time of deposition and post-depositional flowage. Comparisons of pebble fabrics from basal tills, recent sediment flow deposits, and basal, debrished in the constraint control of the constraint control of the constraint control of the control of the

AUDIBILITY WITHIN AND OUTSIDE DEPOS-

ITED SNOW.

Johnson, J.B., Journal of glaciology, 1985, 31(108), p.136-142, 12 refs., In English with French and German summaries. 40-1320

SNOW COVER EFFECT, SNOW ACOUSTICS, SOUND TRANSMISSION, NOISE (SOUND).

SOUND TRANSMISSION, NOISE (SOUND). Pactors which control the audibility within and outside deposition of sound by persons buried under avalanche debris as compared to persons on the overlying snow surface. Strong attenuation of acoustic waves in snow and the small acoustic impedance differences between snow and air are responsible for the strong absorption and transmission-loss characteristics are independent of the direction of propagation of acoustic signals through the snow. The preferential detection of sound by a person buried under snow can be explained by the relatively higher level of background acoustic noise that exists for persons above the snow surface as compared to an avalanche buriel victim. This noise masks sound transmitted to persons on the snow surface, causing a reduction of hearing sensitivity as compared

to the burial victim. Additionally, the listening concentra-tion of a buried individual is generally greater than for persons working on the snow surface, increasing their subjective awareness of sound. (Auth.)

MP 1961 STATISTICAL RELATIONSHIPS BETWEEN COLD REGIONS SURFACE CONDITIONS AND CLIMATIC PARAMETERS.

Bilello, M.A., Conference on Probability and Statistica in Atmospheric Sciences, 9th, Virginia Beach, VA, Oct. 9-11, 1985. Proceedings, 1985, p.508-517, Reprint from preprint volume.

SNOW PHYSICS, ICE PHYSICS, SURFACE PROPERTIES, CLIMATIC FACTORS, ICE COVER THICKNESS, SNOW DENSITY, DEGREE DAYS, FROST.

MP 1962 EMITTANCE: A LITTLE UNDERSTOOD IMAGE DECEPTION IN THERMAL IMAGING AP-PLICATIONS.

Munis, R.H., et al, Society of Photo-Optical In-strumentation Engineers. Proceedings, Apr. 1985, Vol.549, p.72-78, 6 refs.

Marshall, S.J. 40-1423

40-1423 THERMAL RADIATION, THERMAL PROPER-TIES, MATERIALS, RADIOMETRY, TEMPERA-TURE MEASUREMENT.

TURE MEASUREMENT.

Image contrast enhancement sometimes complicates image understanding. A scene that consists of slightly dissimilar target and background emittances may not be readily identifiable without image enhancement. Even if the emittance differential can be sharply contrasted, those image surface patterns that convey subsurface thermal information may not be visible because of the wide dynamic range that must be accommodated by the thermal imaging system. This paper describes how emittance complicates the interpretation of thermal images. High and low emittance values affect the logic required for understanding thermal scenes. Thermal scenes containing emittance differentials are easier to interpret if there is a large contrast between the object and the background.

MP 1963 THERMAL EMISSIVITY OF DIATHERMA-

MOUS MATERIALS.
Munis, R.H., et al, Optical engineering, Sep.-Oct.
1985, 24(5), p.872-878, 10 refs.
Marshall, S.J.

40-1422

RADIOMETRY, OPTICAL PROPERTIES, IN-FRARED PHOTOGRAPHY, TEMPERATURE MEASUREMENT, ABSORPTION, MATERIALS. MEASUREMENT, ABSORPTION, MATERIALS. Thermal (2.0 to 5.6 micron) measurements of the normal emissivity of several diathermanous materials having alightly different refractive indices were made at 15.2 C. 4.9 C, and -5.6 C. Calculations of the total hemispherical emissivity were made from normal emissivity and plotted against the optical depth. A comparison of these data with a model proposed by R. Gardon J. Am. Ceram. Soc. 39(8), 278 (1956) indicates that at near-ambient temperatures they agree very closely. This comparison presumes that the narrow range of refractive indices about n=1.5 associated with these specimens would not preclude them from being treated as having a value of 1.5.

MP 1964
STRATEGIES FOR WINTER MAINTENANCE
OF PAVEMENTS AND ROADWAYS.
Minsk, L.D., et al, New York Academy of Sciences.
Annals, 1984, Vol.431, p.155-167, 14 refs.

40-1427

WINTER MAINTENANCE, ROAD MAINTENANCE, SNOW REMOVAL, ICE REMOVAL, PAVEMENTS, FREEZE THAW CYCLES, CLIMATIC PACTORS, SNOW DEPTH, COST ANAL-

MP 1965 MF 1965 STRUCTURE, SALINITY AND DENSITY OF MULTI-YEAR SEA ICE PRESSURE RIDGES. Richter-Menge, J.A., et al, Journal of energy resources technology, Dec. 1985, 107(4), p. 493-497, For anoth-er source and abstract see 39-2413 (MP 1857). 11 refs.

Cox, G.F.N.

PRESSURE RIDGES, ICE STRUCTURE, ICE SALINITY, ICE DENSITY, ICE PHYSICS, ICE LOADS, SEA ICE, BEAUFORT SEA.

MP 1966 IN-ICE CALIBRATION TESTS FOR AN ELON-GATE, UNIAXIAL BRASS ICE STRESS SEN-

Johnson, J.B., Journal of energy resources technology, Dec. 1985, 107(4), p.506-510, For another source and abstract see 39-2420 (MP 1859). 8 refs.

ICE COVER STRENGTH, ICE SOLID INTER-FACE, ICE LOADS, STRESSES, MEASURING IN-STRUMENTS, TESTS.

MP 1967 EXPERIMENTAL MEASUREMENT OF CHAN-NELING OF FLOW IN POROUS MEDIA. Oliphant, J.L., et al, Soil science, May 1985, 139(5), p.394-399, 10 refs.
Tice, A.R.

40-1481 SOIL WATER, WATER FLOW, POROUS MATERIALS, CHANNELS (WATERWAYS), HY-DRAULICS, VISCOUS FLOW, LAMINAR FLOW,

DIFFUSION.

By comparing experimental measurements of the hydraulic conductivity and the effective self-diffusivity of water in porous media, a channeling parameter, c, is defined. This parameter measures the degree of division of flow paths in the media, but does not depend on the tortuosity of the paths or surface effects on the viscosity of the water. Values of c are obtained for Na-asturated montmorillonites containing from 0.82 to 7.7 g of water per g of clay and for Fairbanks silt containing from 0.135 to 0.23 g of water per g of silt. Values for the montmorillonites remain relatively close to the theoretically predicted value of 1/3 at all water contents, indicating maximally divided flow paths. Values for the silt vary from 100 to over 2000, indicating highly channeled flow.

MP 1968 SOME RECENT DEVELOPMENTS IN VIBRAT-ING WIRE ROCK MECHANICS INSTRUMEN-TATION.

Dutta, P.K., 1985, 12p., 20 refs. Presented at the 26th U.S. Symposium on Rock Mechanics, Rapid City, SD, June 26-28, 1985.

City, 3D, June 20-20, 1903. 40-1490 ROCK MECHANICS, COLD WEATHER OPERA-TION, MEASURING INSTRUMENTS, VIBRA-TION, STRESSES, MODELS, ACCURACY.

MP 1969 BRITTLENESS OF REINFORCED CONCRETE STRUCTURES UNDER ARCTIC CONDITIONS. Kivekäs, L., et al. Finland. Technical Research Centre. Research reports, 1985, No.369, 28 + 14p., In Finnish with English summary. 9 refs. Korhonen, C.

WINTER CONCRETING, CONCRETE STRUC-TURES, LOADS (FORCES), REINFORCED CON-CRETES, CONCRETE STRENGTH, BRITTLE-NESS, FRACTURING, IMPACT STRENGTH, TEMPERATURE EFFECTS.

When plain reinforcing bars are tested under impact load according to the steel standards their failure becomes brittle aiready at the arctic temperature region. However, when reinforced concrete structures are loaded with an impact load, the reinforcing bars are subjected to loading conditions very different from the test with the plain rebars, and this has a significant effect on the transition temperature.

MP 1970 ION AN ION AND MOISTURE MIGRATION AND FROST HEAVE IN FREEZING MORIN CLAY. Qiu, G., et al, Journal of glaciology and geocryology, Mar. 1986, 8(1), p.1014, 9 refa., In Chinese with English summary.

Chamberlain, E.J., Iskandar, I.K.

40-4634
PROST HEAVE, SOIL WATER MIGRATION, IONS, CLAY SOILS, SOIL CHEMISTRY, WATER CONTENT, FREEZING RATE, TESTS.

CONTENT, FREEZING RATE, TESTS.

Sixteen specimens made of Morin Clay with a saturation percentage of 86% were subjected to freezing tests in open system fed by distilled water, NaCl solution, CaCl(2) solution and Na(2)SO(4) solution respectively. Before freezing test, specimens were homogeneous in water content but heterogeneous in chemical composition with a vertical concentration gradient. After freezing test, both water content and the dominant-anilon content in frozen part of the soil samples increase; this means that not only moisture but also ions were migrating toward the freezing zone during tests.

TENSILE STRENGTH OF PROZEN SILT. Zhu, Y., Journal of glaciology and geocryology, Mar. 1986, 8(1), p.15-28, 9 refs., In Chinese with English RIIMMETV Carbee, D.L. 40-4635

FROZEN GROUND STRENGTH, TENSILE PROPERTIES, STRAIN TESTS, SEDIMENTS, SOIL COMPACTION, DENSITY (MASS/-VOLUME), TEMPERATURE EFFECTS.

Constant strain-rate tension tests were conducted on remolded saturated frozen Pairbanks slit at various temperatures, strain rates and densities. It is found that the critical strain rate of the ductile-brittle transition does not depend upon temperature, but varies with density. It has a value of 0.01/s for the silt with medium density and 0.0005/s for low density. The peak tensile strength considerably decreases with decreasing strain rate for ductile failure, while it slightly decreases with increasing strain rate for brittle fracture. The failure strain remains almost the same for temperatures lower than about -2C, but it varies with density and strain rate. The initial tangent modulus is found not to depend upon strain rate, but increases with decreasing temperature and density. Constant strain-rate tension tests were conducted on re

MP 1972 ICE BLOCK STABILITY.

Daly, S.F., Water for resource development, Proceedings of the ASCE Hydraulics Division Specialty Conference, edited by D.L. Schreiber, New York, American Society of Civil Engineers, 1984, p.544-548, 5 refs.

RIVER ICE, ICE FLOES, ICE PRESSURE.

RIVER ICE, ICE FLORS, ICE PRESSURB.

In this paper a simple formulation of the forces acting on an ice block in contact with an intact ice cover is presented. Underturning of the ice block is the assumed mechanism by which the block is swept under the ice cover. The data can be divided into two separate cases, a shallow water case and a deep water case. The conditions of instability for each case are determined empirically. The resultant prediction of the velocity at which the block is swept under the cover reproduces the data very well over the entire trange of nondimensional ice block thicknesses. The "nospill" condition used in earlier formulations is not required.

MP 1973 MATHEMATICAL MODELING OF RIVER ICE

PROCESSES.
Shen, H.T., Water for resource development, Proc ings of the ASCE Hydraulics Division Specialty Conference, edited by D.L. Schreiber, New York, American Society of Civil Engineers, 1984, p.554-558, 16 refa

40-1550 RIVER ICE, ICE FORMATION, ICE BREAKUP, ANALYSIS (MATHEMATICS).

Computer modeling of flow and ice conditions in a river is an important element in the planning of water resources projects in northern regions. In this paper, a brief review on the present knowledge of formulating river ice process is given.

MITIGATIVE AND REMEDIAL MEASURES FOR CHILLED PIPELINES IN DISCONTINU-OUS PERMAFROST.

OUS PERMAFROSI.
Sayles, F.H., Seminar on Pipelines and Frost Heave,
Caen, Apr. 25-27, 1984. Proceedings. English version. Edited by S.R. Dallimore and P.J. Williams. Ottawa, Carleton University, July 1984, p.61-62.

39-3049
DISCONTINUOUS PERMAFROST, FROST
HEAVE, UNDERGROUND PIPELINES, SHEAR
PROPERTIES, FROST ACTION, PERMAFROST
BENEATH ROADS, FROST PENETRATION,
DAMAGE, DESIGN CRITERIA.

MP 1975 USING LANDSAT DATA FOR SNOW COVER/-

USING LANDSAT DATA FOR SNOW COVER-VEGETATION MAPPING.
Merry, C.J., et al, Annual Department of Defense Mapping, Charting, and Geodesy Conference, 9th, 1984. Report, Washington, D.C., Defense Mapping Agency, 1984, p.II(140)-II(144), 7 refs.
McKim, H.L.
40-1535

SNOW COVER DISTRIBUTION, REMOTE SENSING, VEGETATION, LANDSAT, MAPPING, SNOW DEPTH, SNOW WATER EQUIVALENT.

HEATING ENCLOSED WASTEWATER TREAT-MENT FACILITIES WITH HEAT PUMPS.
Martel, C.J., et al, Hanover, NH, U.S.A. CRREL, [1982, 20p., Presented at the Symposium on Utilities Delivery in Cold Regions, Edmonton, Alberta, May 25-26, 1982. Unpublished manuscript. 13 refs. lace, G.E.

WASTE TREATMENT, WATER TREATMENT, UNDERGROUND FACILITIES, UNDERGROUND PIPELINES, HEATING.

COMPARATIVE FIELD TESTING OF BURIED UTILITY LOCATORS.

Bigl, S.R., et al, Hanover, NH, U.S.A. CRREL, 1984, 25p., Presented at the APWA Public Works Conference and Equipment Show, Edmonton, Alberta, May 13-15, 1984. Unpublished manuscript. 1

Phetteplace, G.E., Henry, K.S.

40-1683 UNDERGROUND FACILITIES, UTILITIES. MAGNETIC SURVEYS, MAINTENANCE, DE-TECTION, DAMAGE, TESTS, RADAR ECHOES. TECTION, DAMAGE, TESTS, RADAR ECHOES.
Locating buried utilities for repair, servicing or prevention of damage is often necessary when excavation is to be conducted in a particular area. The most widely used methods for detection of buried facilities are magnetic induction, magnetometry, and radiofrequency tracking. Downward-looking radar units designed specifically for utility location are in the development stages. Comparative field tests of eight locators were conducted at West Point and Newburgh, New York, over various types of buried utilities including iron and steel pipe, cable, vitreous tile pipe and plastic pipe.

MP 1978 HEAT RECOVERY FROM PRIMARY EFFLU-ENT USING HEAT PUMPS.

ENAL USING HEAT PUMPS.
Phetteplace, G.E., et al. CLIMA 2000 Conference,
Copenhagen, Aug. 1985. Proceedings, Vol.6,
[1985], p. 199-203, 1 ref.
Ueda, H.T., Martel, C.J.

40-1682 HEAT RECOVERY, WASTE TREATMENT, WATER TREATMENT, SEWAGE, HEATING.

MP 1979 SIMPLIFIED DESIGN PROCEDURES FOR HEAT TRANSMISSION SYSTEM PIPING. PHEAT TRANSMISSION SYSTEM PIPING.
Phetteplace, G.E., CLIMA 2000 Conference, Copethagen, Aug. 1985. Proceeding, Vol.6, (1985), p.451-456, 5 refs.
40-1686
HEAT TRANSMISSION, UNDERGROUN

UNDERGROUND PIPELINES, WATER PIPELINES, HEAT LOSS, DESIGN, COST ANALYSIS, ANALYSIS (MATH-EMATICS).

ANALYSIS OF HEAT LOSSES FROM THE CENTRAL HEAT DISTRIBUTION SYSTEM AT FORT WAINWRIGHT.

PORE WALLWRIGHT.
Phetteplace, G.E., [1982], 20p., Unpublished manuscript; presented at the Symposium on Utilities Delivery in Cold Regions, Edmonton, Alberts, May 25-26, 1982. 5 refs.

40-1660 HEAT TRANSMISSION, HEAT LOSS, HEATING, HEAT SOURCES, DEGREE DAYS, TEMPERATURE EFFECTS, ANALYSIS (MATHEMATICS), UNITED STATES—ALASKA—FAIRBANKS.

AIRBORNE-SNOW CONCENTRATION MEA-

AIRBORNES-NOW CONCENTRATION MEASURING EQUIPMENT.
Lacombe, J., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1982, 82-17, Snow Symposium, 1st, Hanover, NH, Aug. 1981. Proceedings, p.17-46, ADB-091 442, 12 refs.

SNOWFALL, SNOWFLAKES, FALLING BODIES, MEASURING INSTRUMENTS, VISIBILITY, AIRBORNE EQUIPMENT, ACCURACY,

A brief introduction to the function of the Airborne-Snow Concentration Measuring Equipment (ASCME) and its useful-ness for characterizing the winter environment is given. The deficiencies of alternative systems are identified. ASCME deficiencies of alternative systems are identified. ASCME hardware and basic system operation are described in detail. The governing design equation and choice of design parameters are discussed, along with estimates of system accuracy. Evidence of ASCME's satisfactory performance during its inaugural operation at SNOW-ONE is presented and design improvements to be incorporated and used during SNOW ONE-A are mentioned. Snowfall rate and airborne-snow concentration data are also compared, showing a weak correlation between the two parameters at low concentration levels.

MP 1982 SNOW AND FOG PARTICLE SIZE MEASURE-MENTS.

MENIS.
Berger, R.H., U.S. Army Cold Regions Research and Regineering Laboratory. Special report, June 1982, 82-17, Snow Symposium, 1st, Hanover, NH, Aug. 1981. Proceedings, p.47-58, ADB-091 442, 6 refs. 40-1930

SNOWFLAKES, FOG, PARTICLE SIZE DISTRIBUTION, ELECTROMAGNETIC PROSPECTING, TRANSMISSION, SNOW CRYSTAL STRUCTURE, LIGHT SCATTERING, INFRAED RADIATION, FALLING BODIES, DATA PROCESSING.

During the SNOW-ONE field measurements Kno During the SNOW-ONE field measurements Knollenberg. 2-D grey imaging probles were used to characterize airborne anow. This application of the probes presents problems due to the shape and orientation of the snow particles. The techniques used to surmount these problems are described. Results are presented in a comparison between the total anowflake area concentration and the transmittance in the visible and infrared.

MP 1983 METEOROLOGY AND OBSERVED SNOW CRYSTAL TYPES DURING THE SNOW-ONE EXPERIMENT.

Bilello, M.A., U.S. Army Cold Regions Research and Regineering Laboratory. Special report, June 1982, 82-17, Snow Symposium, 1st, Hanover, NH, Aug. 1981. Proceedings, p.59-75, ADB-091 442, 8 refs. 40-1931

SNOW CRYSTAL STRUCTURE, SNOWFALL, METEOROLOGICAL FACTORS, SNOW-FLAKES, FALLING BODIES, ELECTRICAL MEASUREMENT, OPTICAL PROPERTIES, SNOWFALL, PROPERTIES, S SNOWSTORMS.

SNOWSTORMS.

A survey of the surface pressure systems, weather fronts, and air masses that influenced northern Vermont during the periods of snowfall in January and February 1981 was conducted. Vertical profiles of the temperature and moisture, and observations of the falling snow crystals made at the SNOW-ONE site were also retrieved for the same time period. This information was used to conduct a study on associations between meteorological conditions and observed snow crystal characteristics. Examples of the results obtained from the various nowall events that occurred during the field test period are presented. This study was conducted with the ultimate objective of associating large-scale weather patterns with the on-site frozen particle characterization measurements, and the data obtained concurrently by the electro-optical sensor systems.

MP 1984 METEOROLOGICAL MEASUREMENTS AT CAMP ETHAN ALLEN TRAINING CENTER, VERMONT.

Bates, R., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1982, 82-17, Snow Symposium, 1st, Hanover, NH, Aug. 1981. Proceedings, p.77-112, ADB-091 442, 4 refs. 40-1932

METEOROLOGICAL INSTRUMENTS, SNOW-FALL, PRECIPITATION GAGES, AIR TEMPER-ATURE, SNOWSTORMS, DEW POINT, HUMIDI-TY, WIND VELOCITY, WIND DIRECTION, SNOW WATER EQUIVALENT, VISIBILITY, SNOW DEPTH.

NOW DEPIH.

This paper contains a detailed description of the meteorological instruments used by CRREL at SNOW-ONE, together with information on their performance and reliability.

Some of the data collected are discussed and analyzed. Redfield (1981) presented a substantial amount of the meteorological data obtained by CRREL during SNOW-ONE, including the hourly summaries of observations recorded by a meteorological team from the Atmospheric Sciences Laboratory (ASL), Maynard, Massachusetts.

MP 1985

GEOMETRY AND PERMITTIVITY OF SNOW. Colbeck, S.C., U.S. Army Cold Regions Research and Bugineering Laboratory. Special report, June 1982, 82-17, Snow Symposium, 1st, Hanover, NH, Aug. 1981. Proceedings, p.113-131, ADB-091 442, 37

40-1933 SNOW PHYSICS, ELECTROMAGNETIC PROPERTIES, SNOW ELECTRICAL PROPERTIES, SNOW CRYSTAL STRUCTURE, POROSITY, SNOW WATER CONTENT, UNFROZEN WATER CONTENT.

WATER CONTENT.

The geometry and porosity of dry snow varies widely depending on the history of conditions. The permittivity of dry snow increases with increasing ice content but is not greatly affected by the shapes of the ice particles. In wet snow the permittivity increases with liquid content and the geometry is very important. However, the liquid-like layer has little effect on permittivity. The permittivity is described using Polder and van Santeen's mixing formulae and approximations of the geometries at high and low liquid contents. It is shown that the common assumption of liquid shells over

ice spheres is both physically incorrect and leads to large

MP 1986

SNOW CALORIMETRIC MEASUREMENT AT SNOW-ONE.

Fisk, D., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1982, 82-17, Snow Symposium, 1st, Hanover, NH, Aug. 1981. Proceedings, p.133-138, ADB-091 442.

40-1934 SNOW THERMAL PROPERTIES, SNOW WATER CONTENT, UNFROZEN WATER CONTENT, CALORIMETERS, TEMPERATURE MEASUREMENT, SNOW MELTING, FREEZING, ACCURACY, TESTS.

Free water content of fallen snow was measured near the surface and with depth during the SNOW-ONE Field Experiment using both freezing and melting calorimetric methods. The principles and procedures of each method are described. Test data are presented, possible sources of error are examined, and the problems and relative merits of each method are discussed. Subsequent work and future plans are described.

MP 1987 PROBLEMS IN SNOW COVER CHARACTERI-ZATION.

O'Brien, H.W., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1982, 82-17, Snow Symposium, 1st, Hanover, NH, Aug. 1981. Proceedings, p.139-147, ADB-091 442, 5 refs. 40-1935

SNOW OPTICS, SNOW PHYSICS, INFRARED SPECTROSCOPY, LIGHT TRANSMISSION, UNFROZEN WATER CONTENT, GRAIN SIZE, MILITARY OPERATION, REFLECTIVITY, WAVE PROPAGATION, SNOW COVER, SNOW DENSITY, SNOWFLAKES.

Comparison of spectral reflectance measurements of snow cover with theoretical predictions based on hypothetical snow grain size indicate that the appropriate dimensions for commensuration may be illusive indeed. Measurements of near-infrared reflectance of snow covers in situ are presented in illustration and some potential ramifications inferred.

MP 1988 ACOUSTIC AND PRESSUREMETER METH-ODS FOR INVESTIGATION OF THE RHEO-LOGICAL PROPERTIES OF ICE. Fish, A.M., Hanover, NH, USA CRREL, 1978, 196p.,

Ph.D. thesis. Refs. p.181-196.

40-1843

40-1845
ICE CREEP, RHEOLOGY, ICE STRENGTH,
ACOUSTIC MEASUREMENT, CRACKING
(FRACTURING), COMPRESSIVE PROPERTIES,
PRESSURE, ICE CRYSTAL STRUCTURE, ICE
MECHANICS, TIME FACTOR, MEASURING INSTRUMENTS, SETTLEMENT (STRUCTURAL).

STRUMENTS, SETTLEMENT (STRUCTURAL). Theoretical and experiment studies of time-dependent deformation and failure of columnar-grained ice are presented. Laboratory uniaxial compression tests at constant and steadily increasing stresses were accompanied by simultaneous recording of acoustic emissions. Strength criteria and constitutive equations were established, describing grain disintegration, microcrack imitiation and acoustic emission dynamics during creep, and their relationship to the rheological properties of ice. The rheological properties of ice were studied under laboratory and field conditions using a pressuremeter, leading to the development of an in situ method for determining the mechanical properties of ice taking into account the time factor. The results of the studies were applied in analyses of settlements of foundations on high-ice-content soils and ground ice. Based on the comparison of experimental data with calculated settlements, it is shown that the characteristics of ice used in the analysis can be determined either from laboratory tests or in situ, by means of a pressuremeter.

MP 1989 VIBRATION ANALYSIS OF THE YAMA-CHICHE LIGHTPIER.

Haynes, F.D., International Modal Analysis Conference, 4th, Los Angeles, CA, Feb. 3-6, 1986, Proceedings. Vol.1, Schenectady, N.Y., Union College, 1986, ings. Vol. 1, Schen-p. 238-241, 11 refs.

40-1881

PIERS, VIBRATION, ICE LOADS, SHEAR STRENGTH, MATHEMATICAL MODELS, COM-PUTER APPLICATIONS.

PUTER APPLICATIONS.
To determine its dynamic characteristics, the Yamachiche lighteir located in Lac St. Pierre, Quebec, was instrumented with geophones, accelerometers, and an inclinometer. Fitteen breakable bolts with failure strengths from 45,000 to 450,000 N were used to apply a step unloading force on the pier. The damping and stiffness were obtained from the data in the time domain. The natural frequencies and mode shapes were obtained from the data transformed into the frequency domain. A modal analysis computer program was used to verify the natural frequencies and mode shapes. A mathematical model was developed that includes translation, rotation, and shear beam deformation of the pier.

SOIL FREEZING RESPONSE: INFLUENCE OF TEST CONDITIONS.

McCabe, B.Y., et al. Geotechnical testing journal, June 1985, 8(2), p.49-58, 22 refs.

40-1900

SOIL FREEZING, FROST HEAVE, SOIL COM-PACTION, FROST RESISTANCE, SOIL PRES-SURE, TEMPERATURE GRADIENTS, TESTS.

SURE, TEMPERATURE GRADIENTS, TESTS.

The response of soils to freezing has been assessed in terms of frost heave, and the heaving pressure developed when the specimen is restrained. As both techniques have been suggested for assessing freet susceptibility, it was considered essential to determine the influence of the test conditions on the soil response. This investigation was concerned with specimen preparation, specimen size, and freezing procedure. The test material consisted of an artificially produced matrix, into which controlled amounts of coarse aggregate could be blended. This reduced the likelihood of variation in the results because of random changes in the test materials. The results clearly demonstrated the sensitivity of both heave and heaving pressure to the test conditions. When modified or new test methods are being formulated, it is essential to consider the influence of such factors, particularly when making comparisons between different testing techniques. Such modifications may also require changes in the particular criteria used to assess frost susceptibility.

FIELD OBSERVATIONS OF ELECTROMAGNETIC PULSE PROPAGATION IN DIELECTRIC SLABS.

Arcone, S.A., Geophysics, Oct. 1984, 49(10), p.1763-1773, 15 refs.

ELECTROMAGNETIC PROPERTIES, ICE COVER EFFECT, WAVE PROPAGATION, DIE-LECTRIC PROPERTIES, ICE SHEETS, PRO-FILES, VELOCITY, REFLECTION, REFRAC-TION.

TION.

The propagation of electromagnetic pulses in naturally occurring dielectric surface layers has been examined. Pulse duration used in field experiments reported here has been on the order of nanoseconds with pulse bandwidths in the high VHF to low UHF band. The layers were sheets of fresh water ice and granite at thicknesses ranging between 4 and 4 m. Both transverse electric (TE) and transverse magnetic (TM) modes were attempted but only the TE propagation could be interpreted. Analog recordings of wide-angle reflection and refraction (WARR) profiles were taken and recorded in a continuous graphic display. The displays allowed easy identification of phase fronts thereby facilitating study of the dispersion of the pulses. The phase allowed easy identification of phase fronts thereby facilitating study of the dispersion of the pulses. The phase and group velocities of the wave-group packets agree well with the velocities predicted from dispersion curves derived from the modal waveguide equation. In one case the Airy phase of wave-packet propagation occurred. The best measure of the dielectric constant of the layer was the frequency of the air wave.

ME 1972
SHOPPER'S GUIDE TO ICE PENETRATION.
Mellor, M., U.S. Army Cold Regions Research and
Engineering Laboratory. Special report, Dec. 1984,
SR 84-33, Workshop on Penetration Technology,
Hanover, NH, June 12-13, 1984. Proceedings, p.1-35. ADB-093880, 11 refs 40-1962

40-1962
ICE DRILLS, ICE COVER THICKNESS, PENETRATION, ICE COVER STRENGTH, ROTARY
DRILLS, PROJECTILE PENETRATION, HYDRAULIC JETS, PERCUSSION DRILLS, LASERS, THERMAL DRILLS, EXPLOSION EFFECTS, ANALYSIS (MATHEMATICS), ICE
BLASTING.

MP 1993

SEA ICE CHARACTERISTICS AND ICE PENE-TRATION PROBABILITIES IN THE ARCTIC

Weeks, W.F., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-33, Workshop on Penetration Technology, Hanover, NH, June 12-13, 1984. Proceedings, p.37-65, ADB-093880, 21 refs.

SEA ICE DISTRIBUTION, PENETRATION, PACK ICE, DRIFT, ICE COVER THICKNESS, ICE CRYSTAL STRUCTURE, ICE SALINITY, ICE TEMPERATURE, ICE DEFORMATION, ARCTIC

MP 1994 MODELING OF ARCTIC SEA ICE CHARAC-TERISTICS RELEVANT TO NAVAL OPERA-

TERRISTICS RELEVANT TO NAVAL OPERA-TIONS.
Hibler, W.D., III, et al, U.S. Army Cold Regions Re-search and Engineering Laboratory. Special report, Dec. 1984, SR 84-33, Workshop on Penetration Tech-nology, Hanover, NH, June 12-13, 1984. Proceed-ings, p.67-91, ADB-093880, 21 refs. Weeks, W.F. 40-1964

ICE NAVIGATION, SEA ICE DISTRIBUTION, ICE MECHANICS, DRIFT, ICE COVER THICKNESS, SURFACE ROUGHNESS, ICE SURFACE, ICE BLECTRICAL PROPERTIES, ICE LOADS, ICE STRENGTH, MODELS, RHEOLOGY, VELOCITY.

MP 1995

PENETRATION OF SHAPED CHARGES INTO ICE.

Mellor, M., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-33, Workshop on Penetration Technology, Hanover, NH, June 12-13, 1984. Proceedings, p. 137-148, ADB-093 880, 7 refs.

ICE COVER STRENGTH, MILITARY OPERA-TION, PENETRATION TESTS, EXPLOSIVES, ICE DEFORMATION.

ICE DEFORMATION.

Shaped charges fired from air into ice give holes of typical form for cohesive solids. There are only a few reported results from test shots in ice, but supplementary data can be obtained by adjusting the results from tests in ice-bounded soil in accordance with target density. Present indications are that charges with narrow angle cones (appr. 45 deg) can penetrate about 16 cone diameters, giving a hole diameter near mid-depth of about 1/3 of the cone diameter. Charges with wide-angle cones (60-90 deg) might penetrate about 12 cone diameters, giving a hole diameter near mid-depth of about 2/3 cone diameters. So far, we have no data for shaped charges fired into ice under water.

MP 1996

ICE PENETRATION TESTS. Garcia, N.B., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-33, Workshop on Penetration Technology, Hanover, NH, June 12-13, 1984. Proceedings, p.209-240, ADB-093 880, 6 refs.

p.209-240, ADB-073 Farrell, D., Mellor, M.

40-1974
PENETRATION TESTS, ICE STRENGTH,
GRAIN SIZE, FLEXURAL STRENGTH, BRITTLENESS, IMPACT STRENGTH, VELOCITY,
ICE DENSITY, PROJECTILE PENETRATION,
ICE TEMPERATURE.

MP 1997

MECHANICS OF ICE COVER BREAK-THROUGH.

High Coldin.

Kerr, A.D., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-33, Workshop on Penetration Technology, Hanover, NH, June 12-13, 1984. Proceedings, p.245-262, ADB-093 880, 12 refs. 40-1975

40-1973
ICE COVER STRENGTH, ICE BREAKING,
PENETRATION TESTS, IMPACT STRENGTH,
LOADS (FORCES), PLOATING ICE, BEARING
STRENGTH, TIME PACTOR, MILITARY OPER-ATION, ANALYSIS (MATHEMATICS).

MP 1998

SURFACING SUBMARINES THROUGH ICE. ASBURACING SUBMARINES INKOUGH ICE-ASBUR, A., U.S. Army Cold Regions Research and En-gineering Laboratory. Special report, Dec. 1984, SR 84-33, Workshop on Penetration Technology, Hano-ver, NH, June 12-13, 1984. Proceedings, p.309-318, ADB-093 880, 8 refs. 40-1978

SUBMARINES, ICE COVER EFFECT, PENETRA-TION, ICE MECHANICS, ICE BREAKING, STRESSES, STRAINS, SEA ICE, ANALYSIS (MATHEMATICS). LOADS (FORCES).

MP 1999

ICE DRILLING AND CORING SYSTEMS-A

ICE DRILLING AND CORING SYSTEMS—A RETROSPECTIVE VIEW. Selimann, P.V., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Dec. 1984, SR 84-33, Workshop on Penetration Technology, Hanover, NH, June 12-13, 1984. Proceedings, p. 125-127, ADB-093 880. Rand, J.H. 40.1664.

40-1966 ICE CORES, ICE DRILLS, ICE CORING DRILLS, EQUIPMENT, PENETRATION.

MP 2000 TECHNIQUES FOR MEASUREMENT OF SNOW AND ICE ON FRESHWATER.

Adams, W.P., et al, International Northern Research

Basins Workshop/Symposium, 6th, Jan. 26-30, 1986. Proceedings, Vol.2, Houghton, Michigan Technological University, [1986], p.174-222, Refs. p.219-222. Prowse, T.D., Bilello, M.A. 40-2138

ICE SURVEYS, SNOW SURVEYS, FLOATING ICE, LAKE ICE, RIVER ICE, ICE VOLUME, MEASUREMENT, FREEZEUP, ICE BREAKUP, ICE MECHANICS.

ICE MECHANICS.
Information on routine snow and ice survey programs in Finland, Iceland, Norway, Sweden, Canada and the United States is juxtaposed in this paper.

Standard methods of ice and snow measurement and practical alternative methods are described with information on reporting procedures and data storage. In each case, points of contact are provided for those seeking data on floating snow and ice. The purpose of the paper is to improve the flow of information between those responsible for winter lake and river programs in circumpolar countries.

MODELING SEA-ICE DYNAMICS.

Hibler, W.D., III, Advances in geophysics, 1985, Vol.28, lasues in atmospheric and oceanic modeling. Pt. A: Climate dynamics. Edited by S. Manabe, p.549-579, 44 refs.

ICE MECHANICS, SEA ICE DISTRIBUTION, ICE MODELS, DRIFT, ICE COVER THICKNESS, ICE COVER STRENGTH, FREEZE THAW CYCLES, RHEOLOGY, PLASTIC FLOW, ICE WATER INTERFACE, AIR WATER INTERFACTIONS, SEASONAL VARIATIONS.

MP 2002

SURVEY OF AIRPORT PAVEMENT DISTRESS IN COLD REGIONS.

Vinson, T.S., et al, International Conference on Cold vinson, 1.3., et al, international Conference on Cold Regions Engineering, 4th, Anchorage, Alaska, Feb. 24-26, 1986. Proceedings. Edited by W.L. Ryan, New York, American Society of Civil Engineers, 1986, p.41-50, 5 refs. Zomerman, I., Berg, R., Tomita, H.

AIRPORTS, PAVEMENTS, FREEZE THAW CY-CLES, CRACKING (FRACTURING), DAMAGE, CLIMATIC FACTORS, DESIGN.

CLIMATIC FACTORS, DESIGN.
In early fall 1984, USACRREL conducted a study of airport pavements in cold regions of the United States. The most common pavement problems were associated with non-traffic related phenomena and include (1) pre-existing cracks reflecting through asphalt concrete overlays (in two years or less), (2) thermal cracking, and (3) longitudinal cracking (at a construction joint). Most of the airports experienced (1) water pumping up through cracks and joints in the pavements during spring thaw, or (2) additional roughness due to differential frost heave in the winter, or both problems. Many airport managers reported that debris was generated at cracks during the winter and spring. Several airports experienced problems with lighting in the winter and spring. Many pavement problems can be traced to the evolutionary history of general aviation airports and the lack of consideration for site drainage.

MP 2003 LESSONS LEARNED FROM EXAMINATION OF MEMBRANE ROOFS IN ALASKA.

Tobiasson, W., et al, International Conference on Cold Regions Engineering, 4th, Anchorage, Alaska, Feb. 24-26, 1986. Proceedings. Edited by W.L. Ryan, New York, American Society of Civil Engineers, 1986, p.277-290, 10 refs.

Osgood, S. 40-2449

ROOPS, MOISTURE DETECTION, FREEZE THAW CYCLES, DAMAGE, THERMAL EXPANSION, THERMAL EFFECTS.

SION, THERMAL EFFECTS.

During 1984 and 1985 airborne infrared roof moisture surveys were conducted of membrane roofs at army installations in Alaska. Many of these roofs were also visually inspected and cored to verify infrared findings. Numerous areas of wet insulation were found but often they were small enough and the surrounding roofing system was in good enough condition to warrant removal and replacement of just the wet areas. Essentially all moisture entered from the exterior through flaws in the membrane and flashings. The lack of problems from internal moisture indicates that current vapor retarders, even though imperfect, are adequate. Some "cold regions" appurtenances such as membrane control joints, and insulation breather vents appear to do more harm than good. The protected membrane (upside-down) roofing system is well suited to Alaska but some problems have occurred when the membrane lacks alope to drain. Low-strength concrete pavers used for roof ballast have been deteriorated by freeze-thaw action.

MP 2004

COVER RESEARCH-PRESENT STATE AND PUTURE NEEDS.

Kerr, A.D., et al. International Conference on Cold Regions Engineering, 4th, Anchorage, Alaska, Feb. 24-26, 1986. Proceedings. Edited by W.L. Ryan, New York, American Society of Civil Engineers, 1986, p.384-399, Refs. p.392-399. Frankenstein, G.E. 40-2458

40-2458
ICB COVER STRENGTH, FLOATING ICE, ICE
LOADS, ICE PRESSURE, OFFSHORE STRUCTURES, DYNAMIC LOADS, BEARING
STRENGTH, ENGINEERING, ICE COVER THICKNESS, STRESSES.

THICKNNSS, STRESSES.

Presentation reviews, at first, a number of problem areas in ice engineering, such as the determination of vertical and horizontal forces floating ice covers exert on fixed structures, the bearing capacity of ice covers subjected to loads of short or long duration, and the response of ice covers subjected to moving loads.

The analytical fundamentals are then briefly reviewed and their relationship to actual field conditions is discussed.

The presentation concludes with a discussion of problems encountered in laboratory tests. Throughout the presentation areas that require further study and clarification are indicated.

MP 2005

UPPER DELAWARE RIVER ICE CONTROL-A CASE STUDY.

CASE STUDY.

Zufelt, J.E., et al, International Conference on Cold Regions Engineering, 4th, Anchorage, Alaska, Feb. 24-26, 1986. Proceedings. Edited by W.L. Ryan, New York, American Society of Civil Engineers, 1986, p.760-770, 7 refs.

Doe, W.W., III.

Doe, W. 40-2487

ICE CONTROL, RIVER ICE, ICE JAMS, ICE CONDITIONS, ICE BOOMS, DRIFT, ICE MECHANICS, FLOODING, COUNTERMEASURES. CHANICS, FLOODING, COUNTERMEASURES. The upper one-third of the Delaware River is characterized by a steep gradient with a general riffle/pool sequence. Due to seasonal low flows, a considerable volume of ice is generated and transported throughout the winter months. During February 1981 a catastrophic breakup ice jam occurred along a reach of the Delaware River near Port Jervis, NY, causing \$1.45. million in damages. In February 1982 another breakup ice jam occurred at the same location, causing much concern but minimal flooding and damages. These events prompted the Philadelphia District, U.S. Army Corps of Engineers, to conduct an investigation of the Upper Delaware River to determine if some form of ice control structure could be implemented in order to reduce ice jam-induced flooding. This paper focuses on the field investigations and analyses performed by the U.S. Army Cold Regions Research and Engineering Laboratory for the Philadelphia District during the period 1983-1985. The study included both on site and remote monitoring of ice conditions and hydraulic analysis of several ice control structure alternatives.

EXPERIMENTS ON THERMAL CONVECTION IN SNOW.

IN SNOW.

Powers, D., et al, Annals of glaciology, 1985, Vol.6, Symposium on Snow and Ice Processes at the Earth's Surface, Sapporo, Japan, Sep. 2-7, 1984. Proceedings, p.43-47, 16 refs.

Colbeck, S.C., O'Neill, K.
40-2306

SNOW PHYSICS, CONVECTION, HEAT TRANS-

FER.

Thermal convection is observed in anow and in a compact of water-saturated glass beads.

Permeability of the anow limits our ability to compare the observed and calculated onset of convection, agreement between the observed and calculated effects of convection with glass beads agree with both the calculated onset of and heat transfer by convection.

Attempts are made to sassess the effects of convection on snow metamorphism.

While much is still uncertain about the significance of thermal convection in snow, it is clear that the phenomenon does occur.

MODELLING A SNOWDRIFT BY MEANS OF

ACTIVATED CLAY PARTICLES.
Anno, Y., Annais of glaciology, 1985, Vol.6, Symposium on Snow and Ice Processes at the Earth's Surface, Sapporo, Japan, Sep. 2-7, 1984. Proceedings, p.48-52, 12 refs. 40-2307

SNOWDRIFTS, SNOW MECHANICS, WATER CONTENT, MODELS, WIND VELOCITY, CLAY SOILS, SNOW FENCES.

MP 2008

ACIDITY OF SNOW AND ITS REDUCTION BY ALKALINE AEROSOLS.

Kumai, M., Annais of glaciology, 1985, Vol.6, Symposium on Snow and Ice Processes at the Earth's Surface, Sapporo, Japan, Sep. 2-7, 1984. Proceedings, p.92-94, 9 refs. 40-2317

SNOW COMPOSITION, CHEMICAL PROPERTIES, AEROSOLS, COUNTERMEASURES, SCANNING ELECTRON MICROSCOPY, HY-DROGEN ION CONCENTRATION.

DROGEN ION CONCENTRATION.

Snow crystals scavenge sereosis in the atmosphere during the processes of growth and precipitation. Several kinds of flysah are found in acid anow by scanning electron microscope examination. Plysah particles from coal fired electric power plants in Fairbanks, Alaska, were found to be spherical or irregular in shape with a 0.2 to 50 micron diameter, and were rich in calcium, ellicon, aluminum and iron. The pH of 35 snow samples in Fairbanks ranged from 5.60 to 7.48. The acid snow was changed to alkaline snow by dry fallout of calcium-rich flysah from the electric power plants, which were using calcium-rich Alaskan coal.

MP 2009

MP 2009 ICE ACCRETION UNDER NATURAL AND LABORATORY CONDITIONS,

LABORATORY CUNDITIONS.
Itagaki, K., et al, Annals of glaciology, 1985, Vol.6,
Symposium on Snow and Ice Processes at the Earth's
Surface, Sapporo, Japan, Sep. 2-7, 1984. Proceedings, p.225-228, 13 refs.
Lemieux, G.E., Bosworth, H.W.
40.2451

40-2351

AIRCRAFT ICING, ICE ACCRETION, WIND TUNNELS, UNFROZEN WATER CONTENT, TEMPERATURE FACTORS, HUMIDITY, PRO-

PELLERS.

To compare results of icing studies conducted in wind tunnels with natural icing conditions, a series of rotor icing studies were made on top of Mt. Washington, New Hampshire. The results indicated that considerable differences cust between the two under conditions of similar liquid water content and temperature.

The west-to-dry growth transition temperature, for instance, with comparable temperature and liquid water content, may be more than 10 C higher under natural conditions than in wind tunnel studies.

The possible cause of such discrepancies was found to be the vapor saturation existing in most laboratory experiments. The transition existing in most laboratory experiments. The transition experiment of ice accretion measured in natural fog on board an aircraft agreed better with the results of the Mt. Washington study.

MP 2010

MEASUREMENT OF ICING ON OFFSHORE STRUCTURES.

Minak, L.D., International Workshop on Offshore Winds and Icing, Halifax, Nova Scotia, Oct. 7-11, 1985. Proceedings. Edited by T.A. Agnew and V.R. Swail, Downsview, Ontario, Atmospheric Environment Service, 1985, p.287-292, 3 refs.

40-209

GUING, OFFSHORE STRUCTURES, ICE ACCRETION, SEA SPRAY, SHIP ICING, SUPERSTRUCTURES, ICE DETECTION, PRECIPITATION (METEOROLOGY), LASERS.

MP 2011

WEITING OF POLYSTYRENE AND URE-THANE ROOF INSULATIONS IN THE LABORATORY AND ON A PROTECTED MEM-BRANE ROOF.

BRANE ROUF.
Tobiasson, W., et al, Hanover, NH, U.S. Army Cold
Regions Research and Engineering Laboratory, Dec.
1984, 9p. + figs., 13 refs. Presented at the ASTM
Committee C-16 Conference on Thermal Insulation,
Materials and Systems, Dallas, TX, Dec. 2-6, 1984.
Greatorex, A., Van Pelt, D.
40.7540

ROOPS, THERMAL INSULATION, POLYMERS, CELLULAR PLASTICS, MOISTURE, TEMPERA-TURE GRADIENTS, TESTS.

When subjected to a sustained temperature gradient in the presence of moisture in laboratory wetting tests, urethan and expanded polystyrene roof insulations accumulate enough moisture to significantly reduce their insulating ability. moisture to significantly reduce their insulating ability. Extruded polystyrene is quite resistant to moisture in such tests. But the vapor drive is not as great in actual roofs and it may reverse direction, thereby seasonally drying the insulation. To determine how well the laboratory tests could predict the wetting rate of insulation in actual protected membrane roofs, extruded and expanded polystyrene and urethane insulations were installed in a protected membrane roof in Hanover, N.H. After three years of exposure, little moisture had accumulated in the extruded polystyrene and it still retained essentially all of its initial insulating ability.

MP 2012 MOBILITY OF WATER IN FROZEN SOILS.

Lunardini, V.J., et al, Army Science Conference, June 15-18, 1982. Proceedings, [1982], c15p., 32 reft. Berg, R., McGaw, R., Jenkins, T.F., Nakano, Y., Oliphant, J.L., O'Neill, K., Tice, A. 10-2543

FROZEN GROUND PHYSICS, SOIL WATER MI-GRATION, THAW WEAKENING, FROST HEAVE, UNFROZEN WATER CONTENT, GROUND ICE, SOIL TEMPERATURE, MATH-EMATICAL MODELS.

MP 2013

CONSTRAINTS AND APPROACHES IN HIGH LATITUDE NATURAL RESOURCE SAMPLING AND RESEARCH.

AND RESEARCH.

Slaughter, C.W., et al, Inventorying forest and other vegetation of the high latitude and high altitude regions; Proceedings of an international symposium, Fairbanks, AK, July 23-26, 1984. Edited by V.J. LaBau and C.L. Kerr, Betheada, MD, Society of American Foresters, 1984, p.41-46, 37 refs. Werner, R.A., Haugen, R.K.

40-1365

NATURAL RESOURCES, SNOW COVER EF-FECT, PERMAFROST, METEOROLOGICAL FACTORS, REMOTE SENSING, SEASONAL VARIATIONS, AERIAL SURVEYS.

MP 2014

MP 2014
ICE PENETRATION TESTS.
Garcia, N.B., et al, Cold regions science and technology, Nov. 1985, 11(3), p.223-236, 6 refs.
Farrell, D., Mellor, M.

40-2611

ICE COVER STRENGTH, MILITARY RESEARCH, PROJECTILE PENETRATION, IMPACT STRENGTH, FLEXURAL STRENGTH, BRITTLENESS, PENETRATION TESTS.

BRITTLENESS, PENETRATION TESTS.
Exploratory tests of ice penetration were made by driving small blunt cyfinders into semi-infinite ice at normal incidence. Three types of laboratory tests were made: (1) drop-weight impact (impact speed 1.4-3.1 m/s), (2) high-speed ballistic penetration (impact speed 83-434 m/s), (3) deep penetration at low speed (0.42-4.23 m/s). Penetration by indenters and projectiles could be characterized by the energetics of the process, with little variation of specific energy as penetration speed changed by orders of magnitude. Por biunt penetrators entering ice at -5 C, specific energy was typically in the range 1.5-15 MJ/cu m. Low speed tests provided data on penetration force (and energy) as a function of displacement. The test results were compared with other published laboratory data, and with field tests results for bigger projectiles. bigger projectiles.

MP 2015 STATISTICS OF COARSENING IN WATER-SATURATED SNOW.

Colbeck, S.C., Acta metallurgica, Mar. 1986, 34(3), p.347-352, With French and German summaries. refs. 40-2659

SNOW WATER CONTENT, PARTICLE SIZE DIS-TRIBUTION, SLUSH, WET SNOW, SATURA-TION, STATISTICAL ANALYSIS.

TION, STATISTICAL ANALYSIS.

The particle size distributions in water-saturated snow are distinctly log-normal at all times. The rate of increase of the average volume decreases somewhat with time. Both of these conclusions are contrary to the LSW theory, which should apply to this system. Also, the particles are distinctly spheroidal, probably prolate. These discrepancies might be explained by extending the LSW theory to nonspherical particles with interparticle contacts. When normalized to the mean the distribution is invariant with only the mean changing with time.

MP 2016

SYSTEM FOR MOUNTING END CAPS ON ICE SPECIMENS.

Cole, D.M., et al, Journal of glaciology, 1985, 31(109), p.362-365, 3 refs., With French and German sum-

Gould, L.D., Burch, W.B. 40-2694

ICE CORES, ICE SAMPLING, EQUIPMENT, FREEZING, WATER TEMPERATURE, COMPRESSIVE PROPERTIES.

PRESSIVE PROPERTIES.

This short note describes the equipment and procedures developed to mount end caps on ice-core specimens. The system typically achieves end-plane parallelism within 0.5 micron/mm of specimen diameter (i.e. a total indicator runnut of 0.002 in for a 4.0 in diameter specimen). The essential elements of the system are a holder and an alignment fixture. The holder firmly grips the ice core about its circumference by the compression of two series of O-rings. The alignment fixture clamps the holder to align the ice core procisely with the end caps. To bond the ice to the end cap we form a layer of 0 C water on the end cap; the water freeze immediately upon contact with the ice and forms a strong intimate bond. To date, this system has been used to install phenolic end caps on 101.6

mm diameter cores and aluminum end caps on 76.2 mm diameter cores of saline ice. A somewhat better tolerance was obtained with the aluminum caps, due primarily to the geometric stability of that material under the prevailing conditions. These specimens have been successfully tested in uniaxial and triaxial compression, and with appropriate end caps the system should be suitable for preparing tension specimens as well.

MP 2017

DETERIORATED BUILDING PANELS AT SON-DRESTROM, GREENLAND. Korhonen, C., Northern engineer, Spring 1985, 17(1),

p.7-10, 4 refs. 40-1537

PROST ACTION, BUILDINGS, REINFORCED CONCRETES, THERMAL INSULATION, STRAINS, DAMAGE, WALLS, TEMPERATURE VARIATIONS, VAPOR PRESSURE, MOISTURE, GREENLAND.

MP 2018
CHARACTERISTIC FREQUENCY OF FORCE
VARIATIONS IN CONTINUOUS CRUSHING
OF SHEET ICE AGAINST RIGID CYLINDRICAL STRUCTURES.

Sodhi, D.S., et al, Cold regions science and technology, Feb. 1986, 12(1), p.1-12, 20 refs.

Morris, C.E.

40-2769
ICE LOADS, OFFSHORE STRUCTURES ICE
COVER STRENGTH, ICE SOLID INTERFACE,
ICE PRESSURE, PILES, ICE BREAKING,
VELOCITY, ICE COVER THICKNESS, TESTS, DAMAGE

DAMAGE.

The ice forces generated during continuous crushing of an ice sheet against a cylindrical vertical structure vary with time, according to the resistance offered by ice as it fails and clears from the path of the structure. Small-scale experiments were performed to measure the ice forces by pushing rigid cylindrical structures of different diameters at different velocities through an ice sheet. The dominant frequency, was determined from the frequency spectra of the force records. The characteristic frequency plot with respect to the velocity-to-thickness ratio reveals a linear relationship, which implies that the average length of the damage zone is proportional to the ice thickness. On the basis of the data presented here, the average length of the damage zone is about one-third of the ice thickness.

MP 2019 WAVELENGTH-DEPENDENT EXTINCTION BY

FALLING SNOW. Koh, G., Cold regions science and technology, Peb. 1986, 12(1), p.51-55, 9 refs.

SNOWFALL, LIGHT TRANSMISSION, INFRA-RED RADIATION, LIGHT SCATTERING, VISI-BILITY, WAVE PROPAGATION, PARTICLES.

BILITY, WAVE PROPAGATION, PARTICLES.

Wavelength-dependent extinction in the visible and infrared regions of the electromagnetic spectrum has been observed during studies of transmission through falling snow. The wavelength dependence was particularly noticeable during periods of light snowfall. Particles comparable in size to the wavelengths were also present during these periods. These particles were assumed to be water droplets, and their extinction cross-sections were determined from Miscattering calculations. The calculations suggest that these particles were responsible for the wavelength-dependent extinction observed during snowfall.

ELECTROMAGNETIC MEASUREMENTS OF MULTI-YEAR SEA ICE USING IMPULSE RA-

Kovaca, A., et al, Cold regions science and technology, Feb. 1966, 12(1), p.67-93, 11 refs. Morey, R.M. 40-2775

SEA ICE, ICE BOTTOM SURFACE, ELECTRO-MAGNETIC PROPERTIES, ICE STRUCTURE, BRINES, AIR ENTRAINMENT, RADIO ECHO SOUNDING, DIELECTRIC PROPERTIES, ICE PHYSICS, RADAR ECHOES.

PHYSICS, RADAR ECHOES.
Sounding of multi-year sea ice, using impulse radar operating in the 80- to 500-MHz frequency band, has revealed that the bottom of this ice cannot always be detected. This paper discusses a field program aimed at finding out why this is so, and at determining the electromagnetic (EM) properties of multi-year sea ice. It was found that the bottom of the ice could not be detected when the ice structure had a high brine content. Because of brine's high conductivity, brine volume dominates the loss mechanism in first-year sea ice, and the same was found true for multi-year ice. A two-phase dislectric mixing formula, used by the authors to describe the EM properties of first-year sea ice, was modified to include the effects of the gas pockets found in the multi-year ice. This three-phase mixture model was found to estimate the EM properties of the multiyear ice studied over the frequency band of interest.

MP 2021 THERMAL ANALYSIS OF A SHALLOW UTILI-

Phetteplace, G., et al., [1986], 10p., 4 refs. Prepared for presentation at the 77th Annual Conference of the International District Heating and Cooling Association, June 8-12, 1986, Ashville, NC. Richmond, P.W., Humiston, N. 40, 3350

WASTE DISPOSAL, THERMAL PROPERTIES, UTILITIES, THERMAL CONDUCTIVITY, HEATING, WATER PIPELINES, AIR TEMPERATURE, DESIGN, COUNTERMEASURES, FREEZING.

MP 2022

AERIAL ROOF MOISTURE SURVEYS. Tobiasson, W., Military engineer, Aug. 1985, 77(502), p.424-425. 40-2854

PHOTOGRAPHY, PENETRATION, SURVEYS.

EVALUATING TRAFFICABILITY.
McKim, H.L., Military engineer, Aug. 1985, 77(502),

40-2855 TRAFFICABILITY, SOIL WATER, FROST PENE-TRATION, WATER CONTENT, TRACKED VEHICLES.

COLD FACTOR.
Abele, G., Military engineer, Aug. 1985, 77(502), p.480-481. 40-2857

40-2857
COLD WEATHER CONSTRUCTION, COLD WEATHER OPERATION, MILITARY ENGINEERING, TEMPERATURE EFFECTS, WIND VELOCITY, SNOWFALL, TIME FACTOR, WIND CHILL, ENVIRONMENTS.

MP 2025

GEOTECHNICAL PROPERTIES AND FREE-ZE/THAW CONSOLIDATION BEHAVIOR OF SEDIMENT FROM THE BEAUFORT SEA, ALASKA.

Lee, H.J., et al, U.S. Geological Survey. Open-file report, Oct. 1985, 85-612, 83p., 23 refs. Winters, W.J., Chamberlain, E.J.

BOTTOM SEDIMENT, FREEZE THAW CYCLES, SOIL COMPACTION, SUBSEA PERMAFROST, GROUND ICE, ICE SCORING, OCEAN BOTTOM, SEASONAL FREEZE THAW, OFFSHORE STRUCTURES.

MP 2026 SEA ICE MICROBIAL COMMUNITIES IN AN-TARCTICA.

Garrison, D.L., et al, *BioScience*, Apr. 1986, 36(4), p.243-250, 38 refs.
Sullivan, C.W., Ackley, S.F.

M-2922

SEA ICE, MICROBIOLOGY, BACTERIA, MA-RINE BIOLOGY, CRYOBIOLOGY, ANTARC-TICA—MCMURDO SOUND, ANTARCTICA— WEDDELL SEA.

The role of ses ice community inhabitants as the sub-bottom element in the antarctic food web is reviewed. Ses ice formation is described and the several denizens of this habitat are identified. They serve as food for krill which have been found in brine channels in the ice of McMurdo Sound and the Weddell Sea. Their behaviors, geographic distributions, and populations in antarctic waters are the objects of continuing long term studies.

MP 2027 TOPICAL DATABASES: COLD REGIONS TECH-NOLOGY ON-LINE.

Liston, N., et al, Chemical engineering progress, Jan. 1986, p.12-15, Also presented at the Arctic Offshore Technology Conference and Exposition, Anchorage, Alaska, Sep. 3-5, 1985. Proceedings. Wintaraki, M.E.

40-2996 40-2996
ICE SURVEYS, COMPUTER APPLICATIONS,
SNOW SURVEYS, OFFSHORE STRUCTURES,
OFFSHORE DRILLING, BIBLIOGRAPHIES,
PERMAFROST, ORGANIZATIONS, ENGI-

MP 2028
EFFECT OF FREEZING ON THE LEVEL OF
CONTAMINANTS IN UNCONTROLLED HAZARDOUS WASTE SITES. PART 1. LITERATURE REVIEW AND CONCEPTS.

IURE REVIEW AND CONCEPTS.

Iskandar, I.K., et al, Annual Research Symposium on Land Disposal of Hazardous Waste, 11th, Cincinnati, Ohio, Apr. 29-May 1, 1985. Proceedings, Cincinnati, OH, U.S. Environmental Protection Agency, (1985), p.122-129, 21 refs.

Houthoofd, J.M.
40-2952

40-2952 40-2952
WASTE TREATMENT, WASTE DISPOSAL, SOIL FREEZING, ARTIFICIAL FREEZING, ION DIFFUSION, FROST ACTION, SLUDGES, COUNTERMEASURES, SOIL POLLUTION, ENVIRONMENTAL PROTECTION.

MENTAL PROTECTION.

A literature search indicated that natural freezing may have detrimental effects at uncontrolled hazardous waste sites in the cold-dominated areas because of frost action on buried materials and ion movement in soils. Natural and artificial freezing, however, can be used beneficially to concentrate effluents, and to dewater studges, contaminated sediment and soils. The process of artificial ground freezing can also be used as an alternative to temporarily immobilize contaminant transport and potentially for decontamination of soils, sediments and aludges. A cost and economic analysis procedure was developed and used to evaluate ground freezing.

POTENTIAL USE OF ARTIFICIAL GROUND FREEZING FOR CONTAMINANT IMMOBILI-ZATION.

International Conference on New Frontiers for Hazardous Waste Management, Pittsburg, PA, Sep. 15-18, 1985. Proceedings. 14 refs.

Jenkins, T.F. 40-2951

WASTE TREATMENT, ARTIFICIAL FREEZING, SOIL FREEZING, FREEZE THAW CYCLES, SOIL POLLUTION, COUNTERMEASURES, WASTE DISPOSAL, ENVIRONMENTAL PROTECTION. DISPOSAL, ENVIRONMENTAL PROTECTION.

This paper summarizes a preliminary investigation of the potential use of ground freezing technology for contaminant immobilization. Preezing and thawing were found to significantly decrease the volume of soil sturry and increase the permeability of soils. Frozen metal-contaminated soils eliminated metal leaching to groundwater under the site. Freezing and thawing soils contaminated with moderately volatile organics significantly reduced the soil concentrations of these organics. Freezing the soil from the bottom apparently enhanced upward movement of the organics to the soil surface where losses occurred by volatilization. The amount lost depended on the mobility of the specific volatile component and was as high as 90% for chloroform, betaene and toluene and as low as 45% for tetrachloroethylene. Input to groundwater during freezing and thawing of these organics was much less than the unfrozen (control) treatment. Artificial ground freezing for decontamination of soils and for immobilization of contaminants is now being tested on a larger scale

MP 2030

MP 2030
ECONOMICS OF GROUND FREEZING FOR MANAGEMENT OF UNCONTROLLED HAZ-ARDOUS WASTE SITES.
Sullivan, J.M., Ir., et al., [1985], 15p., National Conference on Management of Uncontrolled Hazardous Waste Sites, 5th, Washington, D.C., Nov. 7-9, 1984.
Proceedings. 26 refs.
Lynch, D.R., Iskandar, I.K.
40-2950

Lynch, D. R., 440-2950
WASTE TREATMENT, SOIL FREEZING, ARTIFICIAL FREEZING, WASTE DISPOSAL, SOIL WATER, THERMAL PROPERTIES, LATENT HEAT, ENVIRONMENT PROTECTION, RE-HEAT, ENVIRO

FRIGERATION.
Ground freezing for hazardous waste containment is an alternative to the traditional and expensive slurry wall or grout curtain barrier technologies. The parameters quantified in this analysis of it include thermal properties, refrigeration line specing, equipment mobilization and freezing time constraints. The economics of the process is discussed based on the Poetsch method for ground freezing. Vertical drill holes with concentric refrigeration lines are spaced along the desired freezing line. A header or manifold system provides coolant to an interior pipe, with the return line being the outer casing. A self-contained refrigeration system pumps coolant around the freezing loop. Temperature-measuring instrumentation is appropriately placed to monitor the progress of the freeze front.

PROCEEDINGS

PROCEEDINGS.
International Offshore Mechanics and Arctic Engineering (OMAE) Symposium, 5th, Tokyo, Apr. 13-18, 1986, New York, American Society of Mechanical Engineers, 1986, 4 vols., Refs. passim. For selected papers see 40-3104 through 40-3199.
Chung, J.S., ed.
40-3103

OFFSHORE STRUCTURES, OFFSHORE DRILL-ING, ICE LOADS, ICE CONDITIONS, ENGINEERING, MEETINGS, ICE MECHANICS, ICE SOLID INTERFACE, IMPACT STRENGTH, ICE

MP 2032 ICE PROPERTIES IN A GROUNDED MAN-MADE ICE ISLAND.

CO., G.F.N., et al, International Offshore Mechanics and Arctic Engineering (OMAE) Symposium, 5th, Tokyo, Apr. 13-18, 1986. Proceedings, Vol.4, New York, American Society of Mechanical Engineers, 1986, p.135-142, 19 refs.

40-3129

40-3129
ICE ISLANDS, GROUNDED ICE, ICE SALINITY, ICE TEMPERATURE, ICE DENSITY, SHEAR STRENGTH, ICE LOADS, ARTIFICIAL ISLANDS, TESTS, OFFSHORE STRUCTURES.

LANUS, IESIS, OPPSHORE STRUCTURES. Salinity, temperature, density, and sheer strength tests were performed on the confined flooded ice in the 1976-77 East Harrison Bay grounded ice island. The constructed ice had a mean salinity of 13.8 ppt, a mean density of 877 kg/cu m, and a mean horizontal shear strength of 0.74 MPa. The shearing resistance of the constructed ice and the sliding resistance of the constructed ice and the sliding resistance of the constructed ice and the sufficient to prevent the island from being pushed off location by ice movement.

MP 2033 FREE AND FORCED CONVECTION HEAT TRANSFER IN WATER OVER A MELTING HORIZONTAL ICE SHEET.

Lunardini, V.J., International Offshore Mechanics and Arctic Engineering (OMAE) Symposium, 5th, Tokyo, Apr. 13-18, 1986. Proceedings, Vol.4, New York, American Society of Mechanical Engineers, 1986, p.227-236, 24 refs. 40-3142

ICE MELTING, HEAT TRANSFER, WATER FLOW, ICE TEMPERATURE, ICE SHEETS, WATER TEMPERATURE, CONVECTION.

WATER TEMPERATURE, CONVECTION.

Experiments were conducted to study the melting of a horizontal ice aheet with a flow of water above it. The experiments were conducted in a refrigerated flume 35 m long with a cross section of 1.2 x 1.2 m. Water depth, temperature, and velocity were varied as well as the temperature and initial surface profile of the ice sheet. It was found that the heat transfer regimes consisted of forced turbulent flow at high Reynolds numbers with a transition to free convection heat transfer at lower Reynolds numbers. There was no convincing evidence of a forced laminar regime.

MP 2034

HEAT TRANSFER CHARACTERISTICS OF THERMOSYPHONS WITH INCLINED EVAPORATOR SECTIONS.

EVALUES, F.D., et al, International Offshore Mechanics and Arctic Engineering (OMAE) Symposium, 5th, Tokyo, Apr. 13-18, 1986. Proceedings, Vol.4, New York, American Society of Mechanical Engineers, 1986, p.285-292, 21 refs.

Zarling, J.P. 40-3150

40-3150
HEAT TRANSFER, EVAPORATION, PERMAFROST THERMAL PROPERTIES, THERMAL
CONDUCTIVITY, PERMAFROST BENEATH
STRUCTURES, POUNDATIONS, WIND
VELOCITY, AIR TEMPERATURE, TESTS,
THAW DEPTH.

THAW DEPTH.

Laboratory tests were conducted on two commercial fullsize thermosyphons, one charged with carbon dioxide and
one with ammonia. The test variables were evaporator
inclinational angle, wind speed and ambient air temperature.
Empirical expressions are presented for thermal conductance
as a function of these test variables. The laboratory test
results were used in finite element simulations run on an
IBM-PC microcomputer to study three design parameters
influencing the thermal regime below slab-on-grade foundations
in a permaftost location. Insulation thickness, thermosyphon conductance and vertical placement were varied in
these simulations. The effect of these variables on the
maximum depth of thaw are given.

CONFINED COMPRESSIVE STRENGTH OF MULTI-YEAR PRESSURE RIDGE SEA ICE

Cox, G.F.N., et al, International Offshore Mechanics and Arctic Engineering (OMAE) Symposium, 5th, Tokyo, Apr. 13-18, 1986. Proceedings, Vol.4, New York, American Society of Mechanical Engineers, 1986, p.365-373, 17 refs.

40-3162

PRESSURE RIDGES, ICE STRENGTH, COM-PRESSIVE PROPERTIES, LOADS (FORCES), SEA ICE, STRAIN TESTS, TEMPERATURE EP-

FECTS, PRESSURE, STRESSES.

FECTS, PRESSURE, STRESSES.

Fity-five constant-strain-rate triaxial tests were performed on vertically oriented multi-year pressure ridge samples from the Beaufort Sea. The tests were performed on a closed-loop electrohydraulic testing machine at two nominel strain rates (1/100,000 and 1/1,000 per sec) and two temperatures (-20 and -5 C). In all of the tests the confining pressure was ramped in constant proportion to the applied axial stress. This paper summarizes the sample preparation and testing techniques used in this investigation and presents date on the confined compressive strength and fellure strain of the ice.

Uniaxial data are also included for comparison.

MP 2036 SOME EFFECTS OF FRICTION ON ICE FORCES AGAINST VERTICAL STRUCTURES. Kato, K., et al, International Offshore Mechanics and RAIO, E., et al. International Offshore Mechanics and Arctic Engineering (OMAE) Symposium, 5th, Tokyo, Apr. 13-18, 1986. Proceedings, Vol.4, New York, American Society of Mechanical Engineers, 1984, p.528-533, 17 refs. Sodhi, D.S., Haynes, D.

40-318 40-318 ICE FRICTION, OFFSHORE STRUCTURES, ICE BREAKING, ICE SOLID IN-TERFACE, ICE CONDITIONS.

TERPACE, ICE CONDITIONS.

The contributions of frictional forces to the overall ice forces exerted against sloping structures have been studied before, but their effect on the ice forces against vertical structures has not yet been studied. In this paper, the influence of frictional resistance on the crushing and buckling failure loads of ice sheets against flat, vertical structures is discussed. Small-scale experiments were conducted to compare experimental results to those from theoretical formulations. The main conclusions of this study are: a) the orunking ice forces increase with increasing coefficient of friction between ice and structure, and b) the buckling failure loads also increase due to changes in boundary condition induced by increasing frictional resistance at the ice/structure interface.

MP 2037 IMPACT ICE FORCE AND PRESSURE: AN EX-

IMPACT ICE FORCE AND PRESSURE: AN EX-PERIMENTAL STUDY WITH UREA ICE. Sodhi, D.S., et al, International Offishore Mechanics and Arctic Engineering (OMAE) Symposium, 5th, Tokyo, Apr. 13-18, 1986. Proceedings, Vol.4, New York, American Society of Mechanical Engineers, 1986, p.569-576, 10 refs. Morris, C.E.

40-3190

ICE LOADS, ICE PRESSURE, OFFSHORE STRUCTURES, IMPACT STRENGTH, PILES, VELOCITY, UREA, EXPERIMENTATION, COMPRESSIVE PROPERTIES.

PRESSIVE PROPERTIES.

An experimental study was undertaken of the total force and local pressure generated during the impact of a vertical cylindrical structure against the edge of an ice sheet. The test structure was an instrumented cylindrical pile that protruddunder a massive ram suspended from two crances in the form of a bifliar pendulum. Measurements were made of impact velocity, total ice force, and pressure at a point on the pile. The dependence of normalized maximum ice forces with respect to aspect ratio has the same trend as that for the crushing failure of an ice sheet against a vertical structure. The results of this study indicate that the instantaneous maximum pressure can be an order of magnitude higher than the unconfined compressive strength of ice.

MP 2035

MP 2038 ICE FLOE DISTRIBUTION IN THE WAKE OF A SIMPLE WEDGE.

SIMPLE WEDGE.

Tatinclaux, J.C., International Offshore Mechanics and Arctic Engineering (OMAE) Symposium, 5th, Tokyo, Apr. 13-18, 1986. Proceedings, Vol.4, New York, American Society of Mechanical Engineers, 1986, p.622-629, 6 refs.

40-3198

ICE BREAKING, ICE WEDGES, ICE FLOES, SEA ICE DISTRIBUTION, ICEBREAKERS, ICE STRENGTH, ICE COVER THICKNESS, ICE MODELS, ICE CONDITIONS, TESTS.

Tests in level ice on an idealized icebreaker bow in the shape of a simple wedge were conducted and the fice size distribution in its wake was observed. The ice fice lengthy and ice fice area were found to follow log-normal probability distributions defined by the length average and area average, and corresponding standard deviations.

MP 2034 CONDENSATION CONTROL IN LOW-SLOPE ROOPS.

Tobiasson, W., Moisture Control in Buildings: Workshop proceedings, Sep. 25-26, 1984. Edited by E. Bales and H. Trechael, Washington, D.C., Building Thermal Envelope Coordinating Council, [1985], p.47-59. 47 refa

40-3204
ROOPS, CONDENSATION, MOISTURE, VAPOR
TRANSFER, AIR FLOW, COUNTERMEASURES,
BUILDINGS, DAMAGE, CONSTRUCTION
MATERIALS, MAINTENANCE.

MATERIALS, MAINTENANCE.

Excessive moisture can damage wood, metal, and concrete roof decks, cause bituminous membranes to wrinkle, shrink, spiti, delaminate and blister and significantly reduce the insulation ability of most roof insulations. Low-sloped wood-frame roofs with below-deck insulation have encountered a significant number of condensation problems. Few such problems occur for compact membrane roofs without intervening air spaces. Air leakage control probably explains the difference. However, serious condensation problems occur in some compact membrane roofs, particularly in cold regions. For most roofs, upward vapor flow in warm weather. Thus, the objective is to install air-vapor retarders to roduce wings wetting to an acceptable level. Ventilation of the space between the membrane and the retarder is also practiced.

MP 2046
ROOF MOISTURE SURVEYS: YESTERDAY,
TODAY AND TOMORROW.

Tobiasson, W., et al, International Symposium on Roofing Technology, 1985. Proceedings. A decade of change and future trends in roofing, Chicago, IL, National Roofing Contractors Association, [1985], p.438-443 + figs., 45 refs.

ROOFS, MOISTURE DETECTION, THERMAL INSULATION, CONDENSATION, MEASURING INSTRUMENTS.

INSTRITON, CONDENSATION, MEASURING INSTRITON, CONDENSATION, MEASURING INSTRITON, CONDENSATION, MEASURING INSTRITON.

Roof moisture surveys are conducted with nuclear meters, capacitance meters take readings at the spots on the roof with points spaced from 5 to 10 feet apart. Nuclear meters sense the amount of hydrogen in the roofing system at each spot. Since most dry roofs contain hydrocarbons, they do not give zero readings. When water also is present on the roof, nuclear readings increase since water is part hydrogen. Capacitance meters create an alternating current electrical field in the roofing system below. When there is water in the roof, its dielectric properties change and the reading on the capacitance meter increases. Capacitance meters do not "see" deeply (a few inches at most) into the roofing system. An infrared scanner senses the temperature of the surface of the roof. Wet insulation changes the ability of the roofing system to store and conduct thermal energy, thereby causing changes in its surface temperature which the infrared scanner can detect. Instead of a mater reading, the infrared results are presented as shades of brightness on a video monitor. This qualitative visual image provides information about every square inch of the roof, but the information is more subjective than the numbers generated at grid points by nuclear or capacitance meters.

VAPOR DRIVE MAPS OF THE U.S.A. Tobiasson, W., et al, Hanover, NH, Cold Regions Research and Engineering Laboratory, (1986), 7p. + graphs, 9 refs. Presented at the ASHRAE/DOE/B-TECC Conference "Thermal Perforamnce of the Exterior Envelopes of Buildings III", Clearwater Beach, FL. Dec. 1985.

40-3202

THERMAL INSULATION, CONDENSATION, MOISTURE, WATER VAPOR, MAPS, BUILDINGS, METEOROLOGICAL FACTORS, DESIGN CRITERIA, SEASONAL VARIATIONS

CRITERIA, SEASONAL VARIATIONS.
The thermal performance of most insulations used in building envelopes will be seriously degraded if the insulation becomes wet. Problematic moisture can come from within the building envelope. Guidance on when to use "sir-retarders" needs improvement. As a step in this direction, weather records have been analyzed and two series of maps have been made that relate the relative humidity within a building to the vapor pressure gradients across the building envelope. Each map in the first series is for a specific ratio of cold weather wetting potential to warm weather drying potential. Each map in the second series is for a specific cold weather wetting potential. To determine which map in each series is most appropriate to use as design criteria, we are requesting guidance from the building profession.

HEAT FLOW SENSORS ON WALLS—WHAT CAN WE LEARN.

Flanders, S.N., American Society for Testing and Materials. Special technical testing publication, 1985, No.885, p.140-149, 10 refs.

THERMAL INSULATION, WALLS, HEAT TRANSFER, HEAT FLUX, HEAT LOSS, BUILD-INGS, ACCURACY, THERMAL CONDUCTIVI-

TY.
This paper addresses the validity of employing heat flow sensors (HFSs) on the indoor surfaces of building walls to determine thermal characteristics. It also reports on the results obtained in the field. Some of the factors affecting HFS measurement accuracy (together with a likely percentage standard deviation attributable to that factor) are as follows: (a) the conductivities of HFS and its surroundings (3%), (b) convection mode changing over the sensor, causing a +21% bias (26%), (c) the mismatch of HFS absorptive with the surroundings (6%), and (d) thermal contact of the HFS with the surface (1%). A propagation-of-errors analysis indicetes that the resulting standard deviation of an HFS measurement would be approximately 10% of the mean of the measurements.

MP 2043 NEED FOR SNOW TIRE CHARACTERIZATION

AND EVALUATION.
Yong, R.N., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Sep. 1985, No.SR 85-15, ISTVS Workshop on Measure-1985, NO.5K 85-15, ISTVS Workshop on Measurement and Evaluation of Tire Performance under Winter Conditions, Alta, Utah, Apr. 11-14, 1983. Proceedings. Edited by G.L. Blaisdell and R.N. Yong, p.1-2, ADA-161 129.

Blaisdell, G.L. 40-3321

TIRES, COLD WEATHER PERFORMANCE, TRACKED VEHICLES, SNOW COVER EFFECT, TRACTION.

MP 2044

DESIGN AND USE OF THE CRREL INSTRU-MENTED VEHICLE FOR COLD REGIONS MO-BILITY MEASUREMENTS.

Blaisdell, G.L., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Sep. 1985, No.SR 85-15, ISTVS Workshop on Measurement and Evaluation of Tire Performance under Winter Conditions, Alta, Utah, Apr. 11-14, 1983. Proceedings. Edited by G.L. Blaisdell and R.N. Yong, p.9-20, ADA-161 129, 2 refs.

40-3223 MOTOR VEHICLES, COLD WEATHER PER-FORMANCE, TRACTION, VEHICLE WHEELS, RUBBER SNOW FRICTION, RUBBER ICE FRIC-TION, DESIGN, VELOCITY, LOADS (FORCES), MEASURING INSTRUMENTS.

MEASURING INSTRUMENTS.

The U.S. Army Cold Regions Research and Engineering Laboratory has recently acquired an instrumented vehicle for the measurement of forces at the tire/surface material interface. The CRREL instrumented vehicle (CIV) is equipped with moment-compensated triaxial load cells mounted in the front wheel assemblies. Forces are measured in the vertical, longitudinal (in the direction of motion) and side directions. In addition, accurate wheel and vehicle speeds and rear axle torque and speed are measured. Modifications to the vehicle (to facilitate the performance of traction and motion resistance tests) include four lock-out type hubs to allow front-, rear- or four-wheel drive and a dual brake system for front-, rear- or four-wheel drive and a dual brake system for front, rear- or four-wheel braking. A mini-computer-based data acquisition system is installed in the whicle to control data collection and for data processing, analysis and display. Discussion of the vehicle includes its operation and use for the evaluation of the tire performance and surface material properties of motion resistance and

MP 2045 WINTER TIRE TESTS: 1980-81.

Blaisdell, G.L., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Sep. 1985, No.SR 85-15, ISTVS Workshop on Meas-SEP. 1703, NO.SR 83-13, ISTVS Workshop on Measurement and Evaluation of Tire Performance under Winter Conditions, Alta, Utah, Apr. 11-14, 1983. Proceedings. Edited by G.L. Blais dell and R.N. Yong, p.135-151, ADA-161 129, 2 refs. Harrison, W.L. 40.3232

40-3333

TIRES, ICE COVER EFFECT, SNOW COVER EF-FECT, MOTOR VEHICLES, COLD WEATHER PERFORMANCE, SURFACE PROPERTIES, TESTS, ROAD ICING, TRACTION.

FIELD DEMONSTRATION OF TRACTION TESTING PROCEDURES.

Blaisdell, G.L., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Sep. 1985, No.SR 85-15, ISTVS Workshop on Measurement and Evaluation of Tire Performance under Winter Conditions, Alta, Utah, Apr. 11-14, 1983. Proceedings. Edited by G.L. Blaisdell and R.N. Yong, p.176, ADA-161 129

SNOW COVER EFFECT, TRACTION, MOTOR VEHICLES, TIRES, TESTS, MEASURING INSTRUMENTS.

MP 2047 PHYSICAL PROPERTIES OF THE SEA ICE COVER.

Weeks, W.F., Nordic seas. Edited by B.G. Hurdle, New York, Springer-Verlag, 1986, p.87-102, Refs. p.98-100. 40-3378

ICE STRUCTURE, ICE COMPOSITION, SEA ICE, ICE PHYSICS, ICE COVER THICKNESS, ICE FORMATION, SNOW COVER, ICE CRYSTAL STRUCTURE, ARCTIC OCEAN.

MP 2048 LARGE-SIZE COAXIAL WAVEGUIDE TIME DOMAIN REFLECTOMETRY UNIT FOR FIELD

Delaney, A.J., et al, IEEE transactions on geoscience and remote sensing, Sep. 1984, GE-22(5), p.428-431, 10 refs.

Arcone, S.A. 40-3307 FROZEN GROUND PHYSICS, ICE ELECTRICAL PROPERTIES, DIELECTRIC PROPERTIES, GROUND THAWING, WAVE PROPAGATION, REFLECTION, MEASURING INSTRUMENTS.

REFLECTION, MEASURING INSTRUMENTS.

A large-diameter open-ended coaxial waveguide has been interfaced with a commercially available time domain reflectometry (TDR) unit for field measurements of the dielectric properties of frozen and thawed soils and ice. A core barrel developed by the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) and modified for use in frozen soil was used to auger an annular slot around which the waveguide fits. Time domain traces of waveforms reflected from the sample-air interface and from a metal short are recorded in the field and later analyzed to give complex dielectric permittivity between 0.05 and 1.0 GHz.

REVERSED-PHASE HIGH-PERFORMANCE LIQUID CHROMATOGRAPHIC DETERMINA-TION OF NITROORGANICS IN MUNITIONS WASTEWATER.

Jenkins, T.F., et al, Analytical chemistry, Jan. 1986, 58(1), p.170-175, 32 refs.
Leggett, D.C., Grant, C.L., Bauer, C.F.

WASTE TREATMENT, WATER TREATMENT, WATER CHEMISTRY, DETECTION, WATER POLLUTION, GROUND WATER.

WATEK CHEMISTRY, DEECTION, WATEK POLLUTION, GROUND WATEK.

Concentrations of HMX, RDX, TNT, and 2,4-DNT are determined in munitions wastewater. Aqueous samples are diluted with an equal volume of 76/24 (v/v) methanol-acetronitrile, filtered through a 0.4 microgram polycarbonate membrane, and analyzed by reversed-phase HPLC using an LC-8 column with 50/38/12 (v/v/v) water-methanol-acetonitrile. The method provided linear calibration curves to at least several hundred micrograms per liter. Detection limits were conservatively estimated to be 26, 22, 14, and 10 microgram/L for HMX, RDX, TNT, and 2,4-DNT, respectively, with corresponding standard deviations of 250 microgram/L. At higher concentrations, the percent relative standard deviation values were approximately 2% for HMX and RDX and 4% for TNT and DNT. A ruggedness test involving the major manipulative steps in the procedure indicated that consistent rer ults required glass sample containers, preconditioning of filters, and careful maintenance of sample-to-organic solvent ratio. The method was tested with munition wastewater from several Army ammunition plants and found to perform adequately for load and pack wastewaters, wastewater from HMX/RDX manufacture, and contaminated groundwater. MP 2050

INTERLABORATORY EVALUATION OF HIGH-PERFORMANCE LIQUID CHROMATO-GRAPHIC DETERMINATION OF NITROOR-GANICS IN MUNITION PLANT WASTEWA-TER.

Bauer, C.F., et al, *Analytical chemistry*, Jan. 1986, 58(1), p.176-182, 11 refs.
Grant, C.L., Jenkins, T.F.

40-3357

WASTE TREATMENT, WATER TREATMENT, WATER POLLUTION, CHEMICAL ANALYSIS, WATER CHEMISTRY, COUNTERMEASURES,

A reversed-phase HPLC method for the determination of nitroorganic compounds (DNT, TNT, RDX, HMX) in munitions wastewaters was evaluated in a collaborative study. Nine laboratories analyzed four aqueous matrices, including groundwater and treated wastewater, which were spiked with the analytes at levels from 30 to 600 microgram/L. Recoveries of analytes were similar regardless of matrix: DNT and RDX being recovered quantitatively, and TNT and HMX ahowing losses of about 5%. Intralaboratory precisions, based on the average of duplicate determinations, were less than 15 microgram/L, which corresponds to 9% relative standard deviation at the average concentration examined. Interlaboratory precisions were at most 50% larger than intalaboratory values. Valid statistical analysis required rejection of about 10% of the data set as outliers. The retionale for applying a variety of statistical evaluations is discussed.

MP 2051 MP 2051

MATHEMATICAL SIMULATION OF NITRO-

GEN INTERACTIONS IN SOILS.
Selim, H.M., et al, Mathematics and computers in simulation, June 1983, 25(3), p.241-248, 21 refs.
Mehran, M., Tanji, K.K., Iskandar, I.K.

40-3464
SOIL CHEMISTRY, GAS INCLUSIONS, WASTE DISPOSAL, GROUND WATER, NITROGEN, WATER FLOW, INTERFACES, MATHEMATICAL MODELS, CONVECTION, AGRICULTURE. CAL MODELS, CONVECTION, AGRICULTURE. Four mathematical models were evaluated for their ability to describe the fate of nitrogen (N) in the soil environment. The first model is a general one which accounts for convective dispersive N transport under transient water flow conditions with active N uptake by plants. Model II considers N transport to be only of the convective type, whereas model III considers N uptake as a passive process. In contrast, model IV considers N transport under conditions of steady state model (IV) are inferior in describing N flow in the soil system as well as the convective dispersive transport mechanisms must be considered for reliable simulation of N behavior in the soil environment.

MEASUREMENT OF THE RESISTANCE OF IMPERFECTLY ELASTIC ROCK TO THE PROPAGATION OF TENSILE CRACKS.

Peck, L., et al, Journal of geophysical research, Aug. 10, 1985, 90(B9), p.7827-7836, 35 refs. Nolen-Hoeksema, R.C., Barton, C.C., Gordon, R.B. 40-3466

ROCKS, CRACK PROPAGATION, ELASTIC PROPERTIES, TENSILE PROPERTIES, FRACTURING, STRENGTH, TESTS.

TURING, STRENGTH, TESTS.
Laboratory tests confirm the accuracy of the compliance equations for wedge-loaded, linearly elastic, double cantilever beam test specimens used for the measurement of fracture energy G(I) but show that there are significant discrepancies with theory in tests on rock specimens of the same design. The dependence of the compliance on the length of the crack in the test specimen is not correctly predicted by theory for the experiments done on rock. The axial load applied to the arms of the double cantilever beam as a result of wedge loading reduces Young's modulus by as much as 44% and decreases the measured elastic anisotropy of specimens of granite. The experiments show that useful measurements of G(I) can be made on rock provided that the Young's modulus used in the determination of G(I) is measured on the same specimen under the same conditions of loading as are used in the fracture experiments.

MP 2653

MP 2053

ON ZERO-INERTIA AND KINEMATIC WAVES. Katopodes, N.D., American Society of Civil Engineers. Hydraulics Division. Journal, Nov. 1982, 108(HY11), p.1381-1387, 5 refs. Discussion by M.G. Ferrick, Journal of hydraulic engineering, Mar. 1984, 110(3), p.352-357, 8 refs. Ferrick, M.G. 40-3483

RIVER FLOW, WAVE PROPAGATION, WATER WAVES, CHANNELS (WATERWAYS), MATHEMATICAL MODELS.

MP 2054 PROCEEDINGS.

Symposium on Applied Glaciology, 2nd, West Lebanon, N.H., Aug. 23-27, 1982, Annals of glaciology, 1983, Vol.4, 314p., Refs. passim. For individual papers see 37-4071 through 37-4120.
Colbeck, S.C., ed.

37-4070

GLACIOLOGY, PERMAFROST, ICE SURVEYS, SNOW SURVEYS, AVALANCHES, SEA ICE.

EQUATIONS FOR DETERMINING THE GAS AND BRINE VOLUMES IN SEA-ICE SAMPLES. Cox, G.F.N., et al. Journal of glaciology, 1983, 29(102), p.306-316, In English with French and German summaries. 13 refs.

Weeks, W.F.
38-1476

38-14/6 SEA ICE, BRINES, GAS INCLUSIONS, ICE DEN-SITY, MATHEMATICAL MODELS.

Equations are developed that can be used to determine the amount of gas present in sea ice from measurements of the bulk ice density, salinity, and temperature in the temperature range of -2 to -30 C. Conversely these relationships can be used to give the density of sea ice as a function of its temperature and salinity, considering both the presence of gas and of solid salts in the ice. Equations are also given that allow the calculation of the gas and brine volumes in the ice at temperatures other than that at which the bulk density was determined. (Auth.)

MP 2056 MP 2056 SURFACE INTEGRAL METHOD FOR DETER-MINING ICE LOADS ON OFFSHORE STRUC-TURES FROM IN SITU MEASUREMENTS. Johnson, J.B., Annals of glaciology, 1983, Vol.4,

p.124-128, 23 refs. 37-4091

ICE LOADS, OFFSHORE STRUCTURES, ICE SOLID INTERFACE, MATHEMATICAL MODELS, SHEAR STRESS, FLOATING ICE.

MEASUREMENTS OF RADAR WAVE SPEEDS IN POLAR GLACIERS USING A DOWN-HOLE RADAR TARGET TECHNIQUE.

Jezek, K.C., et al, Cold regions science and technology, Oct. 1983, 8(2), p.199-208, 17 refs. Roeloffs, E.A.

38-1514

RADAR ECHOES, WAVE PROPAGATION, GLA-CIER ICE, ELECTRICAL RESISTIVITY, AN-TARCTICA—VICTORIA LAND, GREENLAND. TARCTICA—VICTORIA LAND, GREENLAND.

A new technique for measuring the speed of radar waves in polar ice sheets was developed to investigate a previously reported disagreement between the permittivities of laboratory and glacier ice. The technique involves lowering a cylindrical radar target to several carefully measured depths in a borehole and measuring the travel time of a radar wave transmitted from a surface radar unit to the target in the borehole. The experiment was performed at Dome C, East Antarctica, and Dye-3, Greenland, and useable data were collected for target depths between 200 and 800m. After computing the range to the target along a straight ray path and after correcting the travel time for delays in in the radar receiver, the velocities determined from these experiments were found to be in good agreement with evelocities predicted by Robin's empirical formula. The apparent discrepancy between the permittivity of glacier ice, as measured using the radar wide-angle reflection method, and laboratory ice now seems to be due in large part to signal delay in the radar receiver that was ignored in earlier experiments. (Auth.)

MP 2058

MP 2058 RECENT CHANGES IN THE DYNAMIC CON-DITION OF THE ROSS ICE SHELF, ANTARC-

Jezek, K.C., Journal of geophysical research, Jan. 10, 1984, 89(B1), p.409-416, 9 refs.

ICE SHELVES, FLOW RATE, RADAR ECHOES, ICE COVER THICKNESS, ANTARCTICA—ROSS ICE SHELF, ANTARCTICA—SIPLE COAST, AN-TARCTICA—CRARY ICE RISE.

TARCTICA—CRARY ICE RISE.

Variations in the amplitude of radar echoes from the bottom of the grid western half of the Ross Ice Shelf have been analyzed. Contrary to the results of a similar analysis performed for the grid eastern sector of the ice shelf, bands of low signal strength downstream from both Crary Ice Rise and the Siple Coast do not correlate with modern flow lines. The difference in direction between the radar bands downstream of Crary Ice Rise and the present velocity vectors and the absence of of a comparable trend farther east suggest to us that the grounding line around Crary Ice Rise retreated within the last 1000 years. This hypothesis is reinforced by the observation of several domes and hollows in ice thickness downstream of Crary Ice Rise which are similar to a hollow now located in the wake of the ice rise and a dome of its eastern flank. We interpret this as evidence for a rapid increase in flow around the ice rise. Similar but less detailed evidence found downstream of the Siple Coast suggests that there was a regional retreat of the West Antarctic grounding line. (Auth.)

MP 2059

MODIFIED THEORY OF BOTTOM CRE-VASSES USED AS A MEANS FOR MEASURING THE BUTTRESSING EFFECT OF ICE SHELVES ON INLAND ICE SHEETS.

Jezek, K.C., Journal of geophysical research, Mar. 10, 1984, 89(B3), p.1925-1931, 20 refs.

38-2914
ICE SHELVES, CREVASSES, FLOATING ICE, ICE MECHANICS, ANTARCTICA—ROSS ICE

Bottom crevasses are fractures that extend upward into floating ice shelves. They form when seawater penetrates the base of the ice shelf and ruptures the ice up to the level at which englacial stresses equal the stress of the seawater. For a freely floating ice shelf, the penetrating level of closely spaced crevases is estimated at about half the ice thickness

h; for an isolated crevasse the level is about pi h/4. However, an analysis of the heights and locations of bottom crevasses in the Ross ice Shelf shows that none of the crevasses approach the predicted limits, perhaps because the existing theory does not include the back stress which is present in bounded ice shelves. By reformulating the theory to include a back stress term, back stress can be evaluated experimentally from radar measurements of crevasse height and ice thickness. The magnitude of back stress (2 bars in the grid northwest corner of the ice shelf) suggests the ice shelf is playing an important role in buttreasing the inland ice sheet. (Auth.)

WHAT BECOMES OF A WINTER SNOWFLAKE. Colbeck, S.C., Weatherwise, Dec. 1985, 38(6), p.312-

SNOWFLAKES, SNOW CRYSTAL STRUCTURE, SNOW CRYSTAL GROWTH, TEMPERATURE GRADIENTS, TEMPERATURE EFFECTS, VAPOR DIFFUSION.

SIZE AND SHAPE OF ICE FLOES IN THE BAL-FIC SEA IN SPRING.

eppäranta, M., Geophysica, 1983, 19(2), p.127-136,

ICE FLOES, SEA ICE DISTRIBUTION, REMOTE SENSING, ICE MELTING, AERIAL SURVEYS, SEASONAL VARIATIONS, PHOTOGRAPHY, BALTIC SEA.

ICE PROPERTIES IN THE GREENLAND AND BARENTS SEAS DURING SUMMER.

Overgaard, S., et al, Journal of glaciology, 1983, 29(101), p.142-164, With French and German summaries. 34 refs.

Wadhams, P., Leppäranta, M. 37-4260

SEA ICE DISTRIBUTION, ICE COVER STRENGTH, ICE COVER THICKNESS, ICE SALINITY, ICE TEMPERATURE, ICE DENSITY, ICE COMPOSITION, ICE ELECTRICAL PROP-ERTIES, IONS.

GROWTH MODEL FOR BLACK ICE, SNOW ICE AND SNOW THICKNESS IN SUBARCTIC BA-

Leppäranta, M., Nordic hydrology, 1983, 14(2), p.59-70, 22 refs.

38-2109 35-2109
ICE FORMATION, SNOW ICE, SNOW DEPTH,
HEAT FLUX, SNOWFALL, SURFACE TEMPERATURE, MATHEMATICAL MODELS, SNOW
DENSITY, METAMORPHISM (SNOW), ICE

MP 2064
BURIED SEED AND STANDING VEGETATION
IN TWO ADJACENT TUNDRA HABITATS, NORTHERN ALASKA

Rosch, D.A., Occologia (Berlin), 1981, Vol.60, p.359-364, For M.S. thesis see 37-4301. 35 refs. 38-2466

TUNDRA, VEGETATION, GROWTH, SOIL WA-

UNIFIED DEGREE-DAY METHOD FOR RIVER

ICE COVER THICKNESS SIMULATION Shen, H.T., et al, Canadian journal of civil engineering, Mar. 1985, 12(1), p.54-62, 16 refs.

Yapa, P.D. 39-2513

J9-213 ICE COVER THICKNESS, RIVER ICE, DEGREE DAYS, ICE CONDITIONS, ICE BREAKUP, MATHEMATICAL MODELS, CANADA—SAINT LAWRENCE RIVER.

ISOTHERMAL COMPRESSIBILITY WATER MIXED WITH NA-SATURATED MONT-

MORILLONITE.
Oliphant, J.L., et al, Journal of colloid and interface science, Sep. 1983, 95(1), p.45-50, 14 refs.
Low, P.F.

40-3465 WATER CHEMISTRY, COMPRESSIVE PROPERTIES, CLAYS, FREEZE DRYING, THERMODY-NAMICS, EMATICS). MINERALS, ANALYSIS (MATH-

MP 2067

CLEAR IMPROVEMENT IN OBSCURATION Palmer, R.A., Military engineer, Aug. 1985, 77(502), p.476-477. 40-2856

BLOWING SNOW, VISIBILITY, MILITARY OP-ERATION, FOG, DESIGN.

MP 2068

REPEATED LOAD TRIAXIAL TESTING OF FROZEN AND THAWED SOILS.
Cole, D.M., et al, Geotechnical testing journal, Dec.

1985, 8(4), p.166-170, 4 refs. Durell, G., Chamberlain, E.J.

FROZEN GROUND STRENGTH, GROUND THAWING, STRESSES, LOADS (FORCES), THAW WEAKENING, SOIL STRENGTH, FREEZE THAW CYCLES, STRAIN TESTS, DEFORMATION, SOIL WATER, EQUIPMENT. DEFORMATION, SOIL WATER, EQUIPMENT.
This paper describes the equipment and methodology used to determine the resilient properties of granular soils that exhibit thaw-weakening behavior. Such soils suffer a significant loss in stiffness as the result of freezing and thawing and subsequently experience an increase in stiffness during a recovery phase. The recovery phase results from gradual desaturation of the thawed soil and is characterized by an increase in the soil moisture tension level. We have developed a means to simulate this freeze-thaw-recovery process in the laboratory that calls for testing specimens several times at soil moisture tension levels corresponding to field observations.

MP 2069 VERTICALLY STABLE BENCHMARKS: A SYN-

THESIS OF EXISTING INFORMATION.
Gatto, L.W., U.S. Army Corps of Engineers Surveying
Conference, Jacksonville, FL, Feb. 4-8, 1985. Proceedings, 1985, p.179-188, Refs. p.183-185. 40-3527

FROST ACTION, MEASURING INSTRUMENTS, PERMAPROST, BENCH MARKS, TOPOGRAPHIC SURVEYS, HYDROLOGY, STRUCTURES, IC SURVEYS, HYDROLO DEFORMATION, DESIGN.

movement surveys are no more accurate than the benchmarks used as reference. In northern areas, frost action can cause substantial vertical movement of benchmarks. Benchmarks can also subside or shift in wetland and coastal areas. Various benchmark designs and installation procedures reduce or eliminate movement, but information on the designs and procedures is widely scattered and not available to Corps of Engineers Districts in one report. This paper gives the preliminary results of a synthesis of existing information compiled from surveys of Crops of Engineers Districts and Divisions, U.S. and Canadian government agencies and private industry and from a literature review. A matrix for selecting benchmarks appropriate for various climatic and soil conditions will be prepared from the synthesized information. This matrix and a description of the procedures required for installing various types of benchmarks will be available in September 1985. Techniques used for topographic, hydrographic and structural movement surveys are no more accurate than the benchmarks

MP 2070

COLD WEATHER O&M.
Reed, S.C., et al, Operations forum, 1985, 2(2), p.10-15. 6 refs. Niedringhaus, L.

40-3528

WASTE TREATMENT, WATER TREATMENT, COLD WEATHER OPERATION, TEMPERATURE EFFECTS, VISCOSITY, LUBRICANTS.

MP 2071
USACRREL'S SNOW, ICE, AND FROZEN
GROUND RESEARCH AT THE SLEEPERS
RIVER RESEARCH WATERSHED.

Pangburn, T., et al, Eastern Snow Conference, Washington, D.C., June 7-8, 1984. Proceedings, [1984], p.229-240, 25 refs. p.229-240, 2. McKim, H.L.

40-4225

40-4225
SNOW HYDROLOGY, ICE SURVEYS, FROZEN
GROUND PHYSICS, SNOW WATER EQUIVALENT, RUNOFF FORECASTING, WATERSHEDS, MODELS, TEMPERATURE EFFECTS.
The Sleepers River Research Watershed in Danville, Vermont,
has one of the longest historical data bases for a cold regions
area. NOAA/NWS have been conducting research in
anow hydrology at the watershed for the past 24 years;
CREL has been involved for the past 6 years. CREL's
major research involves: 1) developing and testing a sensor
that will measure the water equivalent of snow in near
real time, and 2) modifying existing hydrologic models to
accept remotely obtained data on snow, ice, and frozen
ground.

COMPUTATIONAL MECHANICS IN ARCTIC

arverneering.
Sodhi, D.S., Computer Methods in Offshore Engineering Specialty Conference, Halifax, Nova Scotis, May 23, 1984. Proceedings, [1984], p.351-374, Refs. p.367-374. 40-3529

GE MECHANICS, ICE SOLID INTERFACE, OFFSHORE STRUCTURES, ENGINEERING, ICE LOADS, IMPACT STRENGTH, COLD WEATHER CONSTRUCTION, COMPUTER APPLICATIONS, MATHEMATICAL MODELS, DRIFT, FLOATING ICE.

PLOATING ICS.

A review of munarical modeling in arctic engineering presented, and souphness is given to the work which doe with computational mechanics. For large-scale problem the dynamic model for sea ice and iceberg drift is discussed. For medium-scale problems the bearing eagacity of floating shading said ice-structure interaction for bending, backlife and crushing failures of ice sheets are discussed. A bridgement is also presented on the impact ice forces an the kinematic model for ridge formation.

MP 2073 TANK E/O SENSOR SYSTEM PERFORMANCE IN WINTER: AN OVERVIEW

Lacombe, J., et al, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1985, 26p., Presented at the Smoke/Obscurants Symposium, 9th, Adelphi, MD, April 23-25, 1985.

Redfield, R.K. 40-3530

WHITTARY OPERATION, TANKS (COMBAT VEHICLES), COLD WEATHER OPERATION, METEOROLOGICAL FACTORS, LASERS, INSTRUMENTS, WINTER, VISIBILITY, OPTICAL PROPERTIES, ELECTRICAL PROPERTIES, SNOWFALL

This paper describes the SNOW-III-WEST experiment and a related study conducted in the Federal Republic of Germany that was designed to increase the understanding of the effects of winter weather on the performance of electro-optical sensor that we designed to lictues the innertaneous of the weather on the performance of electro-optical sensor systems in main battle tanks. SNOW-III-WEST was conducted at Camp Grayling, Michigan, during December 1984 and January 1985. Its objectives were to document the performance of the M1 tank EO sensor suits in winter and gather data from threat vehicle EO sensors and M1 tank developmental sensors for use in developing system capability comparisons. To secomplish this, an M1 tank gunners primary sight (GPS) was positioned to view and range to vehicular targets at distances out to 1600 m. The GPS contains a day sight, nigh sight and laser rangefinder. Other U.S. and threat EO systems were co-located with the GPS. Day and sight sight imagery through the device optics was recorded using video equipment while simultaneous target observations by the sight operator were documented. Detailed measurements were made to characterise important target scene and environmental factors. These included:
meteorological, airborne-snow, scene illumination, and stmospheric transmission measurements, as well as inherent and messurouguess, arrorme-mow, scene numanation, and atmospheric transmission measurements, as well as inherent and apparent visible and infrared target/background signature measurements. PM Sanoke's personnel response and evaluation system for target obscursion (PRESTO) was used to document the sight operator's target detection responses.

MP 2074 EFFECIS OF SNOW ON VEHICLE-GENERAT-ED SEISMIC SIGNATURES.

Albert, D.G., Sensor Technology Symposium, 4th, Apr. 26-28, 1983. Report. Vol.1: Unclassified papers, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS, Environmental Laboratory, July 1984, p.83-109, 9 refs. 40-3531

SNOW COVER EFFECT, MILITARY OPERA-TION, SEISMIC SURVEYS, ATTENUATION, ACOUSTICS, SEASONAL VARIATIONS, VEHI-

CLES.

Vehicle-generated seismograms recorded under summer and winter conditions at Fort Devens, Massachusetts, are analyzed and compared. The data were recorded using three-component geophones loosted just beneath the ground surface and microphones mounted on tripode 0.3 m tail. Winter data were recorded with a 0.7-m-thick snow cover present at the test site. The 14-track PM field tapes were digitized in the laboratory at a sampling rate of 500 Hz is proparation for filtering and spectral analysis. The filtering effect of the snow cover on the seismic data is striking. Because the acoustic-to-eismic coupled energy is attenuated by the snow, the appearance and frequency content of the recorded ground motion is changed dramatically. Automatic vehicle classification algorithms will have to account for these effects classification algorithms will have to account for the if they are to operate successfully in the presence

FROZEN PRECIPITATION AND CONCUR-RENTLY OBSERVED METEOROLOGICAL CONDITIONS.

Bilello, M.A., [1985], 11p., Presented at the 42nd Meeting of the Bastern Snow Conference, Montreal, Canada, June 1985. 8 refs. 40-3532

SNOWFALL, PRECIPITATION (METEOROLOGY), METEOROLOGICAL DATA, STATISTICAL ANALYSIS, FREEZING, AIR TEMPERATURE, HUMIDITY, WIND VELOCITY, FOG, VISIBILITY, DIURNAL VARIATIONS.

This study evaluates statistical data for two or more meteorological parameters, recorded concurrently during the winter. The analysis considers only freezing forms of precipitation, placed into seven categories, and correlated with simultaneously observed atmospheric conditions, such as temperature, humidity and wind speed. Computer tabulated data from 11 years of winter weather for München/Riem, West Germany, were obtained for the investigation. Typical results are: 1) the variations in absolute humidity values that can be expected during periode of fog or ground fog at different air temperatures, 2) the likelihood that freezing rain or freezing drizzle will occur least frequently between 1200 and 1700 hours, and 3) the diurnal and monthly air temperatures, relative humidity and examples of the unusual and interesting environmental knowledge that can be gained from available climatic records; similar investigations can be conducted for other sites that have long-term weather records in computer-based files.

MP 2076
EVALUATION OF SEASONAL VARIATION IN
RESILIENT MODULUS OF GRANULAR SOIL
AFFECTING PAVEMENT PERFORMANCE. Johnson, T.C., [1985], c21p., Presented at the 33rd Annual Conference on Soil Mechanics and Founda-tion Engineering, St. Paul, MN, Jan. 1985. 27 refs.

PAVEMENTS, FREEZE THAW CYCLES, FROZ-EN GROUND MECHANICS, ROAD MAINTE-NANCE, SEASONAL VARIATIONS, LOADS (FORCES), DAMAGE, FORECASTING, TESTS, MOISTURE TRANSFER, SOIL STRUCTURE.

MODEL OF 2-DIMENSIONAL FREEZING FRONT MOVEMENT USING THE COMPLEX VARIABLE BE METHOD.

Hromadka, T.V., II, et al, Microsoftware for engineers, Oct. 1985, 1(2), 9p., 7 refs.

Berg, R.L. 40-3585

40-3533

40-3383
SOIL FREEZING, HEAT TRANSFER, FREEZE
THAW CYCLES, BOUNDARY VALUE PROBLEMS, MATHEMATICAL MODELS, SOIL WATER, THERMAL REGIME, COMPUTER APPLICATIONS, LATENT HEAT, PHASE TRANSFORMATIONS, ROADS.
The Complex Variable Regiment Method of CVREM.

FORMATIONS, ROADS.
The Complex Variable Boundary Element Method or CVBBM is used to develop a computer model (CVBFR1) for estimating the location of the freezing front in soil-water phase change problems. Because the numerical technique is a boundary integral approach, the control volume thermal regime is modeled with respect to the boundary values and, therefore, the CVBFR1 data entry requirements are significantly less than that usually required of donain methods such as finite-differences or finite-elements. Soil-water phase change along the fraction forcet is most additionable forcetter. mes or finite-elements. Soil-water phase change the freezing front is modeled as a simple balance en computed heat flux and the evolution of soil-water etric latent heat of fusion.

FRAZIL ICE.

Daly, S.F., Conference on Frontiers in Hydraulic Engineering, Cambridge, MA, Aug. 9-12, 1983. Proceedings. Edited by H.T. Shen, New York, American Society of Civil Engineers, 1983, p.218-223, 8 refs. 40-3554

FRAZIL ICB, ICB CRYSTAL GROWTH, ICE STRUCTURE, RIVER ICB, NUCLEATION RATE, STREAMS, ANALYSIS (MATHEMATICS).

The study of crystal growth and its application to large scale industrial crystallization can provide many insights and quantitative approaches to the problem of frazil ics. Number continuity and heat conservation equations are presented in which the key parameters are crystal growth and nucleation rates. These parameters and frazil morphology are discussed. The problems of applying these equations to natural waterbodies are discussed. Further research needs are multiland.

MP 2079 UNSTEADY RIVER FLOW BENEATH AN ICE COVER.

Perrick, M.G., et al, Conference on Frontiers in Hydraulic Engineering, Cambridge, MA, Aug. 9-12, 1983. Proceedings. Edited by H.T. Shen, New York, American Society of Civil Engineers, 1983, p.254-260, 9 refs. emieux, G.E.

40-3560 RIVER FLOW, ICE COVER EFFECT, RIVER ICE, ICE BREAKUP, FRAZIL ICE, FLOODING, ICE JAMS, WATER WAVES, ICE WATER INTER-

FIRST-GENERATION MODEL OF ICE DETERI-

Ashton, G.D., Conference on Frontiers in Hydraulic Engineering, Cambridge, MA, Aug. 9-12, 1983. Proceedings. Edited by H.T. Shen, New York, American Society of Civil Engineers, 1983, p.273-278, 12 refs. 40-3563

ICE DETERIORATION, ICE MODELS, FLOAT-ING ICE, ICE STRUCTURE, RIVER ICE, LAKE ICE, ICE COVER STRENGTH, ICE BREAKUP, HEAT TRANSPER, DIURNAL VARIATIONS.

HEAT TRANSFER, DIURNAL VARIATIONS. The phenomenon of deterioration of ice, particularly of floating ice on rivers and lakes, is commonly observed during the spring period. The result of the deterioration is a porous, honeycomb-like structure, generally of low strength, and the greatly reduced strength contributes to the timing of ice break-up as well as significantly reducing the load-carrying capacity of the ice cover. A combined radiation-conduction heat transfer analysis is presented that predicts the diurnal strength variations associated with low surface albedo and internal melting. The results are compared with field data.

MP 2001 MODELING OF ICE DISCHARGE IN RIVER MODELS.

Calkins, D.J., Conference on Frontiers in Hydraulic Engineering, Cambridge, MA, Aug. 9-12, 1983. Pro-ceedings. Edited by H.T. Shen, New York, American coedings. Edited by H.T. Shen, New York, America Society of Civil Engineers, 1983, p.285-290, 7 refs. 40-3565

RIVER FLOW, RIVER ICE, ICE MECHANICS, DRIFT, ICE MODELS, HEAT TRANSPER, EX-PERIMENTATION, TEMPERATURE EFFECTS, HYDRAULICS, FREEZEUP.

HYDRAULICS, FREEZEUP.

A thermal modeling criterion for the ice discharge in refrigerated physical river models is presented along with laboratory results. Ice production was evaluated for freshwater and for 0.3% and 1% ures concentrations in water. Discharges of 0.0056 and 0.0094 cu m/s were run in the model river at air temperatures of 5, 10 and 15C. Preliminary results show that as the concentration of ures in the water is increased, the model ice outflow increases. The measured ice discharge at river outlet and the ice accumulation on the riverbed are both linearly related to the air-water temperature difference. The ice accumulation rate on the riverbed are both linearly related to the air-water temperature difference. The ice accumulation rate on the riverbed was also found to be a linear function of time. The freshwater flow had a greater bed accumulation rate than ures-doped solutions. A slight increase in model ice production was noted for the higher water flow rates. Proper acaling of the ice discharge through a model reach may require relaxing the heat transfer coefficient scaling law because sufficient ice cannot be generated in the river, and ice must be introduced at the inlet of the model. By changing the urea concentration in the water or using a separate ice production flume, a wide range of values for the input of model ice discharge can be selected.

DYNAMIC FRICTION OF BOBSLED RUN-NERS ON ICE.

Huber, N.P., et al, Le sport: Enjeu technologique. Edited by A. Midol and T. Mathia, Dec. 4, 1985, 26p.,

Itagaki, K., Kennedy, F.E., Jr.

40-3524
METAL ICE FRICTION, SLEDS, ICE SURFACE, ICE FRICTION, ICE DETERIORATION, DYNAMIC LOADS, MODELS, EXPERIMENTATION, STATISTICAL ANALYSIS.

TION, STATISTICAL ANALYSIS.

The challenge we have been presented with, to perfect the runners of the U.S. Bobsied Team's aled for the 1988 Winter Olympics in Calgary, requires an understanding of the experimentation performed by other researchers, the conclusions reached, and the limitations of their findings. Most of the ice friction studies to date have been made under more or less idealized conditions. Thus, in the highly dynamic situation of a bobsied or a skier sliding on a rough ice surface, a variety of unknown and disregarded factors may contribute greatly to the friction phenomena. For instance, one of the previous studies addressed the mechanical destruction of the ice surface, though carving or melting a track in the ice could account for most of the frictional energy loss. This paper describes the results of a preliminary study performed using a model sled.

OHIO RIVER MAIN STEM STUDY: THE ROLE OF GEOGRAPHIC INFORMATION SYSTEMS AND REMOTE SENSING IN FLOOD DAMAGE ASSESSMENTS.

Edwardo, H.A., et al, International Symposium on Remote Sensing of Environment, 18th, Paris, France, Oct. 1-5, 1984. Proceedings, Vol.1, [1984], p.265-

C.J., McKim, H.L.

40-3531
REMOTE SENSING, RIVER FLOW, TOPO-GRAPHIC FEATURES, FLOODS, DAMAGE, LANDFORMS, GEOGRAPHY, CLASSIFICA-TIONS, MAPPING, UNITED STATES—OHIO BIVER

RIVER.

The Pittsburgh District, Corps of Engineera, has conducted feasibility analyses of various procedures for performing flood damage assessments along the main stem of the Ohio River. Procedures using traditional, although highly automated, techniques and those based on geographic information systems have been evaluated at a test site, the City of New Martinsville, Wetzel County, West Virginia. The flood darage assessments of the test site developed from an automated, convenient of the test site developed from a sutomated, convenient of the test site developed from a sutomated. structure-by-structure appraisal served as the gr

MP 2084
SPATIAL ANALYSIS IN RECREATION RESOURCE MANAGEMENT FOR THE BERLIN LAKE RESERVOIR PROJECT.

Edwardo, H.A., et al, 1984 SPOT Symposium. Proceedings. SPOT simulation applications handbook.

American Society of Photogrammetry, 1984, p.209-219.

Merry, C.J., McKim, H.L. 40-3550

LANDFORMS, RESERVOIRS, REMOTE SENS-ING, TOPOGRAPHIC FEATURES, CLASSIFICA-TIONS, ENVIRONMENT SIMULATION, WATER CHEMISTRY, LAKE WATER, GEOG-RAPHY.

RAPHY.

The simulated SPOT data acquired from aircraft over the study site had several radiometric characteristics which would not be encountered in the nadir-looking satellite observations. These differential scene brightness features were removed from the data. The corrected data were used in two studies to assess their information content for water quality assessment and land cover classification. Both studies indicate that the SPOT data are comparable to high altitude color-infrared serial photography in digital form. The implication for land cover mapping is that techniques developed for LANDSAT MSS will need to be modified to allow for interactive user input and the use of textural and contextual features in automatic digital classification. The results of the water quality analysis point to the potential of the SPOT data for assessing the presence of materials in the light-interactive zone of the water column.

MP 2085 WILDLIFE HABITAT MAPPING IN LAC QUI

MINNESOTA.
Merry, C.J., et al, 1984 SPOT Symposium. Proceedings. SPOT simulation application handbook. American Society of Photogrammetry, 1984, p.205-208. Green, G., Anderson, S.

Green, G., Anderson, S. 40-3549
YEGETATION, REMOTE SENSING, SPECTROS-COPY, PHOTOINTERPRETATION, MAPPING, CLASSIFICATIONS, AGRICULTURE, UNITED STATES—MINNESOTA—LAC QUI PARLE.
SPOT High Resolution Visible (HRV) simulated data were obtained over Lac qui Parle, Minnesota, to determine their usefulness for mapping wildlife habitat categories associated with Corps projects. Ground truth data were available from photointerpreted wildlife habitat unit maps and the agricultural crop inventory prepared for the summer of 1983. A geometric correction could not be applied to the data was assessed. The sample size of 512 x 512 pixels was suscessful in discriminating wheat and affalfa and other uniformly colored areas, but pasture and corn could not be separated. Also, we were not successful in separation of grasslands and legumes. Our results indicated that the 20-m HRV data can be used to photointerpret wildlife habitat using the false color image, but a digital classification cannot be performed. To obtain a habitat map using the HRV data would require a multitemporal analysis.

MP 2086

CRREL INVESTIGATIONS RELEVANT TO OFF-SHORE PETROLEUM PRODUCTION IN ICE-

COVERED WATERS.

Tucker, W.B., International Symposium on Remote Sensing of Environment. Second Thematic Conference "Remote Sensing for Exploration Geology," Fortworth, Texas, Dec. 6-10, 1982, Proceedings. Vol.1, (1983₁, p.207-215, Refs. p.213-215, 40-3547

OFFSHORE STRUCTURES, ICE LOADS, SEA ICE DISTRIBUTION, REMOTE SENSING, DRIFT, ICE CONDITIONS, ICE CRYSTAL STRUCTURE, DESIGN, ICE MECHANICS, ICE STRENGTH

STRENGTH.

The U.S. Army Cold Regions Research and Engineering Laboratory has studied the sea ice environment of the Beaufort Sea for many years. Offshore development is now proceeding beyond the barrier islands and many of these studies have relevance to the planned activities. Sea ice presents a formidable hazard to the design and construction of production platforms and sea floor pipelines. CRREL investigations have addressed a number of the problems associated with these activities and remote sensing has played a major role in some of these studies. Specific efforts at CRREL have addressed the measurement of ice motion, the distribution and morphology of pressure ridges and shore ice pile-ups, ice conditions and thickness, the determination of ice strength, ice crystal structure, and the modeling of ice dynamics and thermodynamics.

MP 2087 ICE BANDS IN TURBULENT PIPE FLOW.

Ashton, G.D., American Society of Mechanical Engineers. Winter annual meeting. Heat Transfer Division. Pamphlet paper, 1984, 84-WA/HT-106, 7p., 10

40-3584 PIPELINE FREEZING, PIPE FLOW, ICE FOR-MATION, HEAT TRANSFER, ICE SURFACE, TURBULENT FLOW, HEAT FLUX, FLOW RATE, EXPERIMENTATION, SURPACE ROUGHNESS.

Results of experiments in two pipe sizes with annular freezing are reported. A wavy ice relief generally formed. The results are compared to a correlation previously proposed by Gilpin based on a thermal criterion and to a correlation developed by Ashton based on a kinematic criterion. The results are discussed within the context of these criteria.

MP 2088

ICE ENGINEERING FACILITY.

Zabilansky, L.J., et al., [1983], 12p. + fig., Prepared for the International Institute of Ammonia Refrigeration, 5th annual meeting, Sarasota, FL, April 17-20, 1983.

40-3609

ICE SURVEYS, LABORATORIES, EQUIPMENT, ICE NAVIGATION, ICE FORMATION, ICE LOADS, ICE JAMS, ENGINEERING, ICING, FLOODS, HEAT RECOVERY.

MP 2089

DATA ACQUISITION IN USACRREL'S FLUME FACILITY.

Daly, S.F., et al, Specialty Conference on Hydraulics and Hydrology in the Small Computer Age, Lake Buena Vista, FL, Aug. 12-17, 1985. Proceedings, Vol.2. Edited by W.R. Waldrop, New York, American Society of Civil Engineers, 1985, p.1053-1058, 1

Wuebben, J.L., Zabilansky, L.J.

40-3610 LABORATORIES, COMPUTER APPLICATIONS, REFRIGERATION, ICE FORMATION, HY-DRAULICS, SEDIMENT TRANSPORT, FRAZIL ICE, UNSTEADY FLOW, ICE COVER EFFECT, ROUIPMENT

EQUIPMENT.
The refigerated flume facility at the U.S. Army Cold Regions Research and Engineering Laboratory (USACRREL), Hanover, New Hampshire, consists of a tiltable flume that is 120 ft long, 4 ft wide and 2 ft deep (36.6 x 1.2 x 0.61 m), two constant-speed centrifugal pumps and associated piping, flow meters, heat transfer devices, automatic valves, etc.

The flume is an experimental facility used to study the formation of frazil ice, temperature effects on sediment transport, unsteady flow under an ice cover, and other subjects relevant to cold regions hydraulics. A computerized data acquisition system has been developed that is based on a Hewlett-Packard 9845B desktop computer.

MP 2090 CAZENOVIA CREEK MODEL DATA ACQUISI-TION SYSTEM.

Bennett, B.M., et al, Specialty Conference on Hydraulics and Hydrology in the Small Computer Age, Lake Buena Vista, FL, Aug. 12-17, 1985. Proceedings, Vol.2. Edited by W.R. Waldrop, New York, Ameri-can Society of Civil Engineers, 1985, p.1424-1429, 4

Zabilansky, L.J.

40-3611

40-3611
MODELS, ICE BREAKUP, COMPUTER APPLICATIONS, RIVER ICE, ICE CONTROL, ICE
JAMS, TESTS, ENGINEERING, STRUCTURES,
DESIGN, COUNTERMEASURES.

The Cazenovia Creek Model is a physical hydraulic model constructed in the 160-ft x 80-ft (48.8-m x 24.4-m) refrigerated constructed in the 160-ft x 80-ft (48.8-m x 24.4-m) refrigerated research area of the Ice Engineering Facility at the U.S. Army Cold Regions Research and Engineering Laboratory located in Hanover, New Hampshire. The purpose of the model is to reproduce river ice breakup phenomens for optimizing the design of an ice control structure. The optimal design will delay or ultimately prevent the passage of ice flose, eliminating downstream ice jam flooding. The performance of the ice control structure during a simulated breakup is monitored by using an interactive real-time data acquisition system. The data acquisition system is governed by a Hewlett-Packard 9845A deaktop computer and enables a rapid analysis of the work because of the real-time monitoring. This paper discusses the model and its method of data collection.

MP 2091

INSTRUMENTATION FOR AN UPLIFTING ICE FORCE MODEL.

Zabilansky, L.J., Specialty Conference on Hydraulics and Hydrology in the Small Computer Age, Lake Buena Vista, FL, Aug. 12-17, 1985. Proceedings, Vol.2. Edited by W.R. Waldrop, New York, Ameri-can Society of Civil Engineers, 1985, p.1430-1435, 4 refs.

MODELS, OFFSHORE STRUCTURES, COMPUT-ER APPLICATIONS, FREEZEUP, ICE PRES-SURE, ICE LOADS, ENGINEERING, WATER LEVEL, PILE STRUCTURES.

Marine structures frozen into an ice cover are subjected to vertical forces as the ice sheet responds to changes in the water level. Pile-supported, light duty structures are especially vulnerable to the uplifting forces which can extract the piles from the soil, destroying the structure's integrity. To evaluate the parameters that control the magnitude of the uplifting force a laboratory model study was conducted in a refrigerated test basin.

MP 2092

REAL-TIME MEASUREMENTS OF UPLIFTING

ICE FORCES.
Zabilansky, L.J., Instrumentation in the aerospace industry, 1985, Vol.31, p.253-259, 2 refs.
40-3638

ICE SOLID INTERFACE, PILE EXTRACTION, ICE LOADS, PILE LOAD TESTS, OFFSHORE STRUCTURES, DAMAGE, COUNTERMEAS-URES, COMPUTER APPLICATIONS.

BOUNDARY INTEGRAL EQUATION SOLU-TION OF MOVING BOUNDARY PHASE CHANGE PROBLEMS.

O'Neill, K., International journal for numerical methods in engineering, 1983, Vol.19, p.1825-1850, 47 refs.

SOIL FREEZING, ANALYSIS (MATHEMATICS), BOUNDARY VALUE PROBLEMS, PHASE TRANSFORMATIONS, CONVECTION, STEFAN PROBLEM, TEMPERATURE GRADIENTS, PIPES (TUBES).

PIPES (TUBES).

Boundary integral equation methods are presented for the solution of some two-dimensional phase change problems. Convection may enter through boundary conditions, but cannot be considered within phase boundaries. A general formulation be complete heat equation, followed by a simpler formulation using the Laplace equation. The latter is pursued and applied in detail. An elementary, noniterative system is constructed, featuring linear interpolation over elements on a polygonal boundary. Nodal values of the temperature gradient normal to a phase change boundary are produced directly in the numerical solution. The system performs well against basic analytical solutions, using these values in the interphase jump condition, with the simplest formulation of the surface normal at boundary vertices. Because the discretized surface changes automatically to fit the scale of the problem, the method appears to offer many of the advantages of moving mesh finite element methods. However, it only requires the manipulation of a surface mesh and solution for surface variables. In some applications, coarse meshes and very large time steps may be used, relative to those which would be required by fixed grid domain methods. Computations are also compared to original lab data, describing two-dimensional soil freezing

with a time-dependent boundary condition. Agrees between simulated and measured histories is good.

HELICOPTER SNOW OBSCURATION SUB-

Ebersole, J.F., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1984, SR 84-20, SNOW-TWO data report. Vol.2: System performance. Edited by R. Jordan, p.359-376, ADB-101 241.

40-3784.
40-3784.
MILITARY OPERATION, HELICOPTERS, NAVI-GATION, BLOWING SNOW, SNOW COVER EF-FECT, PHOTOGRAPHY, AIR CUSHION VEHI-CLES, DETECTION, COUNTERMEASURES, TESTS

TRSTS.

Three sets of helicopter-downwash-produced snow obscuration trials were conducted (two sets on 8 December 1983, one set on 17 January 1984), for a total of 30 individual trials. Both hovering and forward flight patterns were performed. In order to obtain an adequate data base which is relevant to Army scenarios, the planned flight altitudes chosen for the test were for representative flying at low-level or NOE (nap-of-earth) missions and landing. In addition, some test flight trials were directed towards information on "masking" and "unmasking" below and above terrain features or tree tops. Thus the altitudes for the test were primarily restricted to no higher than 50 feet above the surface for forward flights, and 150 feet for hovering. Plights were made perpendicular to the main transmissometer line of sight, or in hovering, vertical take-off and landing modes.

MP 2095

MP 2095 SNOW-COVER CHARACTERIZATION: SAD-ARM SUPPORT.

DESEED, FL., et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1984, SR 84-20, SNOW-TWO data report. Vol.2: System performance. Edited by R. Jordan, p.409-411, ADB-101 241. O'Brien, H., et al, U.S. Army Cold Regions Research

Bates, R. 40-3787

40-3/8/ SNOW OPTICS, SNOW ELECTRICAL PROPER-TIES, MILITARY OPERATION, METEOROLOG-ICAL FACTORS, SNOW COVER EFFECT, DE-TECTION, SNOW DENSITY, SNOW WATER CONTENT, GRAIN SIZE, SNOW DEPTH.

FIELD SAMPLING OF SNOW FOR CHEMICAL OBSCURANTS AT SNOW-TWO/SMOKE WEEK

VI. Cragin, J.H., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, June 1984, SR 84-20, SNOW-TWO data report. Vol.2: System performance. Edited by R. Jordan, p.265-270, ADB-101 241, 3 refs. 40-3782

40-3782
MILITARY OPERATION, SMOKE GENERATORS, SNOW COMPOSITION, SNOWFALL,
SNOW SURFACE, VISIBILITY, CHEMICAL
ANALYSIS, AIR POLLUTION, TESTS.

MP 2097

MP 2097
TERRAIN ANALYSIS FROM SPACE SHUTTLE
PHOTOGRAPHS OF TIBET.
Kreig, R.A., et al, International Conference on Cold
Regions Engineering, 4th, Anchorage, Alaska, Feb.
24-26, 1986. Proceedings. Edited by W.L. Ryan,
New York, American Society of Civil Engineers,
1986, p.400-409, 14 refs.
Guodong, C., Brown, J.
40-2459

40-2459

40-2459
PERMAFROST DISTRIBUTION, ALPINE LANDSCAPES, REMOTE SENSING, TOPOGRAPHIC
FEATURES, CONTINUOUS PERMAFROST,
MAPPING, SPACEBORNE PHOTOGRAPHY,
AERIAL SURVEYS, TIBET.

EFFECT AND DISPOSITION OF THE IN A TERRESTRIAL PLANT.

Palazzo, A.J., et al, Journal of environmental quality, Jan.-Mar. 1986, 15(1), p.49-52, 24 refs. Leggett, D.C. 40-3708

SOIL POLLUTION, PLANT PHYSIOLOGY, VEGETATION, MILITARY FACILITIES, ROOTS, DAMAGE, WASTE DISPOSAL, WATER TREAT-

MENT.

Little is known about the response of terrestrial plants to 2,4,6-trinitrotoluene (TNT). To assess its effects, yellow nutsedge (Cyperus esculentus L.) was grown in hydroponic cultures containing TNT concentrations of 0, 10, and 20 mg/L. The deleterious effects of TNT were rapid and occurred at solution concentrations of 5 mg/L and higher. Root growth was most affected, followed by leaves and rhizomes. Root weights were reduced about 95% when grown in the presence of TNT. Plant yields were 54 to 74% lower than the control. The TNT and its metabolites,

4-amino-2,6-dinitrotoluene (4-ADNT), and 2-amino-4,6-dinitrotoluene (2-ADNT) were found throughout the plants. Solutions were continually monitored to ensure that no metabolites were present in solution. Since TNT was the only compound taken up, the metabolites must have formed within the plant. Levels of 4-ADNT exceeded those of 2-ADNT and TNT itself, ranging up to 2200 mg/kg in roots of plants grown in 20 mg/L of TNT. The greatest quantities of all three compounds were found in the rhizomes. Increasing solution TNT levels increased the concentrations and quantities of all three compounds in the plants.

MP 2099

METEOROLOGICAL VARIATION OF ATMO-SPHERIC OPTICAL PROPERTIES IN AN AN-TARCTIC STORM.

Egan, W.G., et al, Applied optics, Apr. 1, 1986, 25(7), p.1155-1165, 56 refs. Hogan, A.W. 40-3771

40-3771
REMOTE SENSING, BLOWING SNOW, ALBEDO, VISIBILITY, AEROSOLS, SOLAR RADIATION, ANTARCTICA—AMUNDSEN-SCOTT STATION.

STATION.

Ground truth inputs obtained during an antarctic storm were applied to the Dave vector atmospheric model. The spectropolarimetric properties of upwelling atmospheric radiation are quantitatively related to the number of ice crystals in the optical path. At large scattering angles (smaller angles in the plane of vision), the ice crystal scattering produces strong polarization proportional to the concentration. However, at small scattering angles, the ice crystals cause generally small polarization, permitting the generally large polarization properties of the underlying terrestrial surface to be inferred. Ice crystals, by virtue of their edges, scatter differently than spheres and may have scattering cross sections many orders of magnitude greater than an equivalent area sphere. Polarization appears to be a useful adjunct in synoptic passive atmospheric remote sensing. (Auth.)

MP 2100

FINITE ELEMENT SIMULATION OF ICE CRYSTAL GROWTH IN SUBCOOLED SODI-UM-CHLORIDE SOLUTIONS.

OMA-CHIORIDE SOLUTIONS.
Sullivan, J.M., Jr., et al, International Conference on Numerical Methods in Engineering: Theory and Applications (NUMETA 85), Swansea, Wales, Jan. 7-11, 1985. Proceedings, Vol.1. Edited by J. Middleton and G.N. Pande, Rotterdam, A.A. Balkema, 1985, p.527-532, 12 refs. Lynch, D.R., O'Neill, K.

ICE CRYSTAL GROWTH, SOLUTIONS, TEM-PERATURE EFFECTS, FREEZING, DENDRITIC ICE, ANALYSIS (MATHEMATICS).

ICE, ANALYSIS (MATHEMATICS).

A finite element solution for ice-crystal growth in subcooled sodium-chioride solution is presented. The freezing process for aqueous solutions requires simultaneous solution of the heat equation in the solid and a complete transport treatment in the liquid region. The moving ice surface in the simulations is continuously tracked via deformable grids. Heat and mass are conserved exactly in the simulations. Specifying the interface temperature based on the constitutional phase diagram is inadequate due to the disparate interfacial growth kinetics for the A-axis and C-axis of the ice crystal. Herein we apply radiation type boundary conditions on the ice interface which maintain temperature close to equilibrium along a fast-growth axis, but allow subcooled conditions to prevail along a slow-growth axis. This preliminary report concentrates on problem formulation and one-dimensional verification of the method against analytic solutions.

MP 2101 MP 2101 PERFORMANCE BASED TIRE SPECIFICA-TION SYSTEM FOR MILITARY WHEELED VEHICLES.

Blaisdell, G.L., U.S. Army Survivable Tire Symposium, Carson City, NV, Nov. 4-8, 1985. Proceedings, 1985, p.277-280, 2 refs. 40-3884
TIRES, MILITARY EQUIPMENT, VEHICLES, DESIGN.

DESIGN.

Most military wheeled vehicles continue to utilize the NDCC tire, despite its extremely low tread life and relatively poor performance. Current tire technology has far surpassed that available when the NDCC tire was designed, yet the Army continues, on all but its newest vehicles, to apply this tire. With such a disparity between the NDCC tire and what is commercially available, and with the potential now to design a tire for numerous specific performance areas, how does the Army determine what tire it should use for a particular vehicle? In answering this question, a working group was formed, and a new tire specification was developed. This system is based not on specific design features in as much as is possible, but on critical areas of tire performance. This system takes into account the vehicle's mission profile and the necessity of certain minimum levels of performance for various conditions.

MP 2102
RADIAL TIRE DEMONSTRATION.
Liston, R.A., U.S. Army Survivable Tire Symposium,
Carson City, NV, Nov. 4-7, 1985. Proceedings.
[1985], p.281-285.
40-3866

TIRES, MILITARY EQUIPMENT, MILITARY TRANSPORTATION, VEHICLES.

TRANSPORTATION, VĒHICLES.

A demonstration of the use of commercially available radial tree on the Army's 5 ton dump truck is currently in progress at Wildflecken, Germany. One construction company, Company C of the 54th Engineering Battalion, has approximately half of its trucks equipped with radial tires and half with the standard military tires. The purpose of the demonstration is to identify the improved off-road, highway, and tread wear performance of the commercial radial tire compared to the bias ply, non-directional cross country tire that has been the US Army standard tire for some forty years. Some information relative to fuel usage and rolling resistance are provided.

MP 2103
TIME-LAPSE THERMOGRAPHY: A UNIQUE
ELECTRONIC IMAGING APPLICATION.
Marshall, S.J., et al, International Electronic Imaging
Exposition and Conference, Boston, MA, Sep. 11-13,

Exposition and Conference, Boston, MA, Sep. 11-13, 1984, 1984, p.84-88, 21 refs.

Munis, R.H.

40-4226

SURFACE TEMPERATURE, INFRARED PHOTOGRAPHY, ELECTRONIC EQUIPMENT, LAS-

ERS.

A new technique has been recently introduced that combines time-lapse video techniques with those of thermal imaging. As a result, dynamic thermal events can be recorded in fast or slow motion and played back at expanded or compressed rates compatible with digital enhancement and analysis techniques. The enhancement techniques are used to improve the capability for pattern recognition as well as for the rapid extraction of maximum, minimum and average surface temperatures. The equipment necessary to assemble and operate a typical time-lapse thermal imaging system is deacribed along with some examples of practical and research applications. The capabilities, limitations, and future possibilities are also discussed.

MP 2104 SIMPLE MODEL OF ICE SEGREGATION USING AN ANALYTIC FUNCTION TO MODEL

HEAT AND SOIL-WATER FLOW. Hromadka, T.V., II, et al, International Offshore Mechanics and Arctic Engineering Symposium, 3rd, New Orleans, Louisiana, Feb. 12-17, 1984. Proceedings, Vol.3. Edited by V.J. Lunardini, New York, American Society of Mechanical Engineers, 1984, p.99-104, 10 refs.

Guymon, G.L. 38-2031

38-2031
FROST HEAVE, SOIL FREEZING, HEAT
TRANSFER, MOISTURE TRANSFER, FREEZE
THAW CYCLES, GROUND ICE, SOIL WATER
MIGRATION, HYDRAULICS, WATER PRESSURE, MATHEMATICAL MODELS.

PROCEEDINGS.

International Offshore Mechanics and Arctic Engineering Symposium, 4th, Dallas, Texas, Feb. 17-21, 1985, New York, American Society of Mechanical Engineers, 1985, 2 vols., Refs. passim. For selected papers see 39-2382 through 39-2438. Chung, J.S., ed, Lunardini, V.J., ed. 39-2381

OFFSHORE STRUCTURES, OFFSHORE DRILL ING, ICE CONDITIONS, ICE LOADS, IMPACT STRENGTH, ENGINEERING, CONSTRUCTION MATERIALS, OCEANOGRAPHY, MEETINGS.

MP 2106 ICE GOUGE HAZARD ANALYSIS. Lanan, G.A., et al, Offshore Technology Conference, 18th, Houston, Texas, May 5-8, 1986. Proceedings, Vol.4, 1986, p.57-66, 13 refs. Niedoroda, A.W., Weeks, W.F.

ICE SCORING, TRENCHING, OCEAN BOTTOM, PIPELINES, MARINE GEOLOGY.

Sea floor ice gouge depth distributions and pipeline trenching requirements are analyzed. An improved method is presented for parameterizing new ice gouge events based on a single record of existing sea floor ice gouges. Information on the gouge infilling process and the maximum observable gouge depth are used in this procedure.

MP 2107

MP 2107
RELIABLE, INEXPENSIVE RADIO TELEME-TRY SYSTEM FOR THE TRANSFER OF METEOROLOGICAL AND ATMOSPHERIC DATA FROM MOUNTAIN-TOP SITES.

Govoni, J.W., et al, International Workshop on Atmospheric Icing of Structures, 3rd, Vancouver, B.C., May 6-8, 1986. Proceedings, Canadian Electrical Association, [1986], 6p., (4.2). 6 refs.

Rancourt, K.L., Oxton, A.

40-3967

POWER LINE ICING, ICING, RADIO COM-MUNICATION, TELECOMMUNICATION, ICE ACCRETION, STRUCTURES, MOUNTAINS, METEOROLOGICAL DATA, WIND VELOCITY, WIND DIRECTION, PRECIPITATION (METEOROLOGY), COMPUTER APPLICA-TIONS 2MOTE

TIONS.

A study to examine orographic effects on atmospheric icing intensity is being conducted on two remote mountaintops in the northeastern United States. The study involves the collection and transmission of meteorological data, including wind speed and direction, precipitation, humidity, temperature, and icing rate. Remote sites are located on Loon Mountain and Cannon Mountain, both situated in the White Mountains of New Hampshire. State-of-the-art instrumentation, consisting of hot cross wire wind sensors, humidity probes, ice detectors and electronic rain gauges, is interfaced with on-site data loggers. The data are transmitted from these remote sites by a specially designed radio telemetry system, consisting of a Tucson Amsteur Packet Radio Terminal Node Controller (TNC) and a Motorola radio link.

CONDUCTOR TWISTING RESISTANCE EF-FECTS ON ICE BUILD-UP AND ICE SHED-

Govoni, J.W., et al, International Workshop on Atmospheric Icing of Structures, 3rd, Vancouver, B.C., May 6-8, 1986. Proceedings, Canadian Electrical Association, [1986], 8p. + figs., (5.8). 5 refs.

Ackley, S.F.
40-3983

ICING, ICE REMOVAL, CABLES (ROPES), ICE BREAKING, WIND VELOCITY, EXPERIMEN-

TATION.

Two wires of similar diameter (about 1 cm) but with different rwisting resistance or torsional rigidity were tested under otherwise similar environmental icing conditions at the summit of Mt. Washington. It was found that the more rotationally gigid (stiffer) wire affected both the mode of ice buildup and showed some capability of deicing itself in moderate wind conditions. The lesser ice buildup on the stiffer wire is apparently related to the suppression of dynamic twisting oscillations in the wire, oscillations which were apparent in the softer wire. The softer wire showed heavier ice buildup with the wire at the center of a cylindrical accretion. The stiff wire showed less ice buildup on the windward side with the development of an elliptical accretion due to semi-static rotation of the wire. Deicing of the stiffer wire apparently took place by breaking of the ice after it slowly rotated into the wind by several possible mechanisms. The increased drag on the ice as it moved into the wind creates a bending moment which apparently exceeded the failure stress of the ice near where it was attached to the wire. The ice fails and drops off the wire and the cycle then repeats itself.

MP 2109

COMMUNICATION TOWER ICING IN THE NEW ENGLAND REGION.

Mulherin, N., et al, International Workshop on Atmospheric Icing of Structures, 3rd, Vancouver, B.C., May 6-8, 1986. Proceedings, Canadian Electrical Association, [1986], 7p., (6.9). 15 refs.

Ackley, S.P.

40-3991

ICING, TOWERS, HOARFROST, TRANSMISSION LINES, PRECIPITATION (METEOROLOGY), DAMAGE, COST ANALYSIS.

GY), DAMAGE, COST ANALYSIS.

Rime icing and freezing precipitation are of concern to the radio and television broadcasting industry. This paper discusses the results of a study seeking to document the severity and extent of transmitter tower icing and related problems in the northeastern United States. Information was obtained via mail questionnaire and telephone interviews with eighty-five station owners and engineers concerning 118 different stations. Results show that television and PM broadcasters are seriously impacted, yet AM operators are, in general, only slightly affected by expected New England cing levels. Combined annual costs for icing protection and icing related repairs averaged \$121, \$402, and \$3066 for AM. FM, and TV stations, respectively. None of the AM stations polled employ any icing protection measures, whereas all the TV stations do.

STRUCTURE OF ICE IN THE CENTRAL PART OF THE ROSS ICE SHELF, ANTARCTICA.
Zotikov, I.A., et al. Akademiia nauk SSSR. Institut
geografii. Materialy gliatsiologicheskikh issledovanii, 1985, No.54, p.39-44, 8 refu., In Russian with English summary. Gow, A.J., Jacobs, S.S.

ICE SHELVES, ICE COMPOSITION, ICE CORES, ICE CRYSTALS, IMPURITIES, CLIMATIC CHANGES.

Studies of ice cores, obtained from a 416 m. deep borehole in the Ross Ice Shelf in the vicinity of the I-9 station, revealed changes in ice crystal structure, inclusions and dimensions with depth. This variation is explained by climatic

MP 2111

TOXIC ORGANICS REMOVAL KINETICS IN OVERLAND FLOW LAND TREATMENT.

Jenkins, T.F., et al, Water research, 1985, 19(6), p.707-

Leggett, D.C., Parker, L.V., Oliphant, J.L. 40-3900 718, 32 refs

WASTE TREATMENT, WATER TREATMENT, WATER POLLUTION, LAND RECLAMATION, VEGETATION, EXPERIMENTATION, MOD-

ELS.
The efficiency in removing 13 trace organics from wastewater was studied on an outdoor, prototype overland flow land treatment system. More than 94% of each substance was removed at an application rate of 0.4 cm/h (0.12 cu m/h/m of width). The % removals declined as application rates were increased. Removal from solution was described by first-order kinetics. A model based on the two-flim theory was developed using three properties of each substance (the Henry's constant, the octano-water partition coefficient and the molecular weight) and two system parameters (waverage water depth and residence time). The dependence of the removal process on temperature was consistent with the known dependence of Henry's constant and diffusivity on temperature. The model was tested on a second overland flow system.

MP 2112

WASTEWATER TREATMENT AND REUSE PROCESS FOR COLD REGIONS.

FRUCESS FUR CULD REGIONS.
BOUZOUM, J.R., Cold Regions Environmental Engineering Conference, Pairbanks, AK, May 18-23, 1983.
Edited by T. Tilsworth and D.W. Smith, [1983], p.547-557, 11 refs. 40-3993

WASTE TREATMENT, WATER TREATMENT, SLUDGES, LAND RECLAMATION, DESIGN.

REVEGETATION ALONG PIPELINE RIGHTS-

OF-WAY IN ALASKA. Johnson, L., International Symposium on Environmental Concerns in Rights-of-Way Management, 3rd, San Diego, CA, Feb. 15-18, 1982. Proceedings, State College, Misaissippi State University, 1984, p.254-264, 12 refs.

40-3994 REVEGETATION, VEGETATION, PIPELINES, INTRODUCED PLANTS, GRASSES, UNITED STATES—ALASKA.

STATES—ALASKA.

The Trans-Alaska Pipeline System for transporting crude oil from Prudhoe Bay to Valdez has recently been completed.
The Alaskan Natural Gas Transportation System for transporting gas from Prudhoe Bay to the "Lower 48" is under construction. The rights-of-way of both these major pipelines traverse the arctic and subarctic climatic zones, where severe environmental conditions require specialized measures for revegetating disturbed terrain. On the oil pipeline for revegetating disturbed terrain right-of-way an aggressive grass seed for revegetating disturbed terrain. On the oil pipeline right-of-way an aggressive grass seeding and fertilizing program was used for revegetation, while on the natural gas pipeline natural reinvasion will be encouraged. These different approaches reflect different management goals and changing technologies as revegetation research progresses in the far north. This paper presents some of the implications of these methods for long-term restoration of disturbed terrestrial

MP 2114

COMBINED ICING AND WIND LOADS ON A SIMULATED POWER LINE TEST SPAN. Govoni, J.W., et al, International Workshop on Atmospheric Icing of Structures, Trondheim, Norway, June 19-21, 1984. Proceedings, [1984], 7p., 3 refs.

Ackley, S.F. 40-3995

POWER LINE ICING, ICE LOADS, ICE ACCRETION, WIND PRESSURE, UNFROZEN WATER CONTENT, SUPERCOOLED CLOUDS, WIND VELOCITY, TESTS.

During the winter of 1982-83 measurements of combined icing and wind loading, along with in-cloud liquid water content and droplet size, were obtained on a simulated power line test span at the 2000-meter summit of Mt. Washington,

New Hampshire. Icing loads were measured using a triaxial load cell which resolves three perpendicular force components of the wire tension. Wind speeds were obtained from a vaned pitot-static tube located near one end of the test wire. Wind and gravity loading of the test span was obtained for winds up to 30 m/s. The in-line loading, a combination of wind and gravity loads, ranged up to 2500 N for ice accretions of up to 19 cm in diameter. Some indications were found that rougher rime ice accretions had higher drag than glaze accretions.

MP 2115

MEASURED AND EXPECTED R-VALUES OF 19 **BUILDING ENVELOPES.** Flanders, S.N., ASHRAE transactions, 1985, 91(2B),

p.49-57, 3 refs. 40-3992

BUILDINGS, THERMAL INSULATION, HEAT TRANSFER, WALLS, HEAT FLUX, MANUALS, ROOFS, COLD WEATHER CONSTRUCTION.

ROOPS, COLD WEATHER CONSTRUCTION. This paper compares in situ measurements of R-values R(c) with R-values obtained from handbook calculations for 19 Army buildings in Colorado, Washington, and Alaska. The R-values were measured with heat flux and temperature sensors, with data averaged and recorded for several days. The handbook calculations rely on borings in the construction, depth probes, boroscope inspection, and sa-built drawings. A subjective measure of certainty about the construction reflects the quality of this information. Examination of selected study cases indicated that convention is a fravour. reflects the quality of this information. Examination of selected study cases indicated that convection is a frequent heat transfer mechanism in fibrous insulation, in both walls and attics. Thermal bridges were also evident from the measurements. Air leakage and moisture were not significant causes of (delta)R. Measurements of R-values were found to be in good agreement with handbook values, where knowledge of the construction is good and where convection and thermal bridges are not major effects.

MP 2116

MP 2116

HYDROLOGIC ASPECTS OF ICE JAMS. Calkins, D.J., Symposium: Cold Regions Hydrology, Fairbanks, Alaska, (1986). Proceedings. Edited by D.L. Kane, Bethesda, MD, American Water Re-sources Association, 1986, p.603-609, 14 refa.

40-407/ ICE JAMS, HYDROLOGY, RIVER ICE, SNOW-MELT, THERMAL ANALYSIS, RIVER FLOW. MELT, THERMAL ANALYSIS, RIVER FLOW.

The hydrologic aspects of ice jams have received very little attention. This paper examines hydrologic information that is important for analyzing ice jam flooding problems, such as flow measurements under the ice cover and winter stage rating curves, frequency analysis of winter flow records, watershed cooling and natural river thermal regimes, ice discharge and snowmelt runoff prediction. The significance of each of these areas is addressed and suggested research opportunities are examined. During the last 30 years, the major emphasis has been placed on understanding the hydraulics and mechanics of ice jams and determining their "flood" levels. However, a parameter that should be known "hood" levels. However, a parameter that should be known with reasonable accuracy is the flow discharge at the ice jam location.

MP 2117

REMOTE SENSING OF THE ARCTIC SEAS. Weeks, W.F., et al, Oceanus, 1986, 29(1), p.59-64, 7

Carsey, F.D. 40-4196

40-4196 SEA ICE DISTRIBUTION, ICE CONDITIONS, REMOTE SENSING, MICROWAVES, ICE ME-CHANICS, ICE COVER THICKNESS, RADIA-TION BALANCE, AIR TEMPERATURE, ARCTIC OCEAN.

MP 2118

ORIENTATION TEXTURES IN ICE SHEETS OF QUIETLY FROZEN LAKES. Gow, A.J., Journal of crystal growth, Feb.-Mar. 1986,

74(2), p.247-258, 19 refs. 40-4118

ICE CRYSTAL STRUCTURE, LAKE ICE.

MP 2119

ARCTIC ICE AND DRILLING STRUCTURES Sodhi, D.S., Mechanical engineering, Apr. 1985, 107(4), p.63-69. 40-4162 OFFSHORE STRUCTURES, DRILLING, ICE

LOADS.

MP 2120

LAWRENCE RIVER FREEZE-UP FORE-CAST.

Foltyn, E.P., et al, Journal of waterway, port, coastal and ocean engineering, July 1986, 112(4), p.467-481, 16 refs.

Shen, H.T. 40-4246

ICEBOUND RIVERS, ICE FORECASTING, RIVER ICE, FREEZEUP, ICE FORMATION, LONG RANGE FORECASTING, ANALYSIS (MATHEMATICS), AIR TEMPERATURE, WATER TEMPERATURE, SAINT LAWRENCE

In this study a method for making long-range forecasts of freeze-up dates in rivers is developed. The method requires the initial water temperature at an upstream station, the long-range air temperature forecast, the predicted mean flow velocity in the river reach, and water temperature response parameters. The water temperature response parameters can be either estimated from the surface heat exchange coefficient and the average flow depth or determined empirically from recorded vie and water temperature date. by from recorded air and water temperature data. The method is applied to the St. Lawrence River between Kingston, Ontario, and Massena, New York, and is shown to be capable of forecasting the freeze-up data.

VARIATION OF ICE STRENGTH WITHIN AND BETWEEN MULTIYEAR PRESSURE RIDGES IN THE BEAUFORT SEA.

Weeks, W.F., Journal of energy resources technology, June 1985, 107(2), p.167-172, 6 refs. For another source see 38-2036 (MP 1680). 39-3284

STRENGTH, PRESSURE RIDGES, PRESSIVE PROPERTIES, POROSITY, TESTS.

PRESSIVE PROPERTIES, POROSITY, TESTS.

A recent series of tests on the uniaxial compressive strength of ice samples taken from multiyear pressure ridges allows the testing of several hypotheses concerning the variation in strength within and between ridges. The data set consists of 218 strength tests performed at two temperatures (-5 and -20 C) and two strain rates (.001 and .0005/s). There was no significant difference between the strength of the ice from the ridge sails and the ice from the ridge keels when tested under identical conditions. As the total porosity of the ice from the keels, the lack of a significant difference is believed to result from the large variations in the structure of the ice which occur randomly throughout the corea. A three-level analysis of variance model was used to study the variations in strength between 10 different ridges, between cores located side by side in a given ridge, and between samples from the same core. In all cases the main factor contributing to the observed variance was the differences within cores. This is not surprising considering the rather extreme local variability in the structure of ice in such ridges. There was no reason at the 5 percent level of significance to doubt the hypothesis that the different cores at the same site and and the different ridges have equal strength means.

MP 2122

DETERIORATION OF FLOATING ICE COV-

Ashton, G.D., Journal of energy resources technology, June 1985, 107(2), p.177-182, 18 refs. For another source see 38-2020 (MP 1676). 39-3286

39-3286
ICE DETERIORATION, FLOATING ICE, ICE
COVER STRENGTH, ICE MELTING, HEAT
TRANSFER, SOLAR RADIATION, ALBEDO,
THERMAL REGIME, POROSITY.

THERMAL REGIME, POROSITY.

The deterioration of floating ice covers is analyzed to determine under what conditions the ice cover loses strength due to internal melting. The analysis considers the interaction between sensible heat transfer and long wave radiation loss at the surface, the surface albedo, the short wave radiation penetration and absorption and the unsteady heat conduction within the ice. The thermal analysis then leads to a determination of the porosity of the ice that allows strength analysis to be made using beam-type analyses. The results provide criteris to determine when and how rapidly the ice cover loses strength and under what conditions it will regain the original strength associated with an ice cover of full integrity.

MP 2123

LABORATORY STUDY OF FLOW IN AN ICE-COVERED SAND BED CHANNEL.

Wuebben, J.L., IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.1, City, Aug. 18-22, 1986₁, p.3-14, 11 refs. 40-4529

CHANNELS (WATERWAYS), ICE COVER EFFECT, WATER FLOW, BOTTOM TOPOGRAPHY, SANDS, FLOW RATE, BOTTOM ICE, SEDI-TRANSPORT, MENT TESTS. ANALYSIS (MATHEMATICS).

(MATHEMATICS).

The objective of this study was to examine the effects of adding an ice cover to flow in a movable bed channel. A series of five tests at four water discharges were conducted in a 36-m-long recirculating flume facility that is 1.2 m wide and 0.6 m deep. After uniform, equilibrium conditions were established for a flow of water with a free surface, essentially identical runs were repeated with the addition of smooth and rough ice covers. All tests were run at room temperature, approximately 19 C, with simulated ice covers. The sediment was a uniform, 0.45-mm-diameter quartz sand and bed forms were in the ripple and dune regimes. The major variables examined in this paper include bed form height, wavelength, Manning's roughness and sediment discharge.

MP 2124 COMPARISON OF TWO CONSTITUTIVE THEORIES FOR COMPRESSIVE DEFORMA-TION OF COLUMNAR SEA ICE.

TION OF COLUMNAR SEA 14.E.
Brown, R.L., et al, IAHR Symposium on Ice, 8th, Iowa
1086 Proceedings, Vol.1, City, Aug. 18-22, 1986. Pr (1986), p.241-252, 11 refs. Richter-Menge, J.A., Cox, G.F.N.

40-4549

ICE DEFORMATION, COMPRESSIVE PROPER-TIBS, ICE CRYSTAL STRUCTURE, SEA ICE, VIS-COBLASTIC MATERIALS, MODELS, STRESS STRAIN DIAGRAMS, ANALYSIS (MATHEMAT-

titutive formulations are used to represent the co Two constitutive formulations are used to represent the constitutive behavior of columnar sea ice under variable path compressive loadings. The first is a single integral representation which has been successfully used to model viscoelastic materials. This representation is a convenient form for describing nonlinear rate dependent properties and is mathematically more tractable than multiple integral representations or nonlinear differential relations. The second constitutive formulation is an elastic-viscoplastic relation which defines the instantaneous strain rate in terms of several microdynamical variables (compressive mobile dialocation density, tensile mobile dialocation density, and specific microcrack surface area).

FRACTURE TOUGHNESS OF MODEL ICE. Dempsey, J.P., et al, IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.1, 1986, p.365-376, 28 refs. Bentley, D.L., Sodhi, D.S. 40-4558

ICE CRACKS, FRACTURING, ICE STRENGTH, TENSILE PROPERTIES, COMPRESSIVE PROP-ERTIES, STRESSES, STRAINS.

ERTIES, STRESSES, STRAINS.

A wedge-loaded TDCB (tapered double-cantilever-beam) test specimen was used to measure the fracture toughness of model ice. Crack path stability under tensile cracking conditions was ensured by way of the crack-parallel compressive stress provided by the displacement controlled wedge loading. The TDCB specimen size and ice thickness were such that plane strain fracture toughness values were obtained. The influence of crack tip scuity and loading rate were

LABORATORY AND FIELD STUDIES OF ICE

LABORATORY AND FIELD STUDIES OF ICE FRICTION COEFFICIENT.
Tatinclaux, J.C., et al, IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.1, 1986, p.389-400, 5 refs.
Forland, K.A., Murdey, D.

40-4560

ICE FRICTION, ICE CRYSTAL STRUCTURE, SURFACE ROUGHNESS, STEEL STRUCTURES, SHEAR STRENGTH, TESTS, AIR TEMPERA-TURE, PLATES, LABORATORY TECHNIQUES. TURE, PLATES, LABORATORY TECHNIQUES. Results of laboratory and field tests on the dynamic friction factor between ice (freahwater, user-doped, and granular or columnar sea ice) and bare or Inerta-coated steel plates of various roughness averages are presented. Laboratory tests were made at three air temperatures, T = -15, -9, and -2 C, with either the ice sample towed over the test plate or a plate sample towed over the ice sheet. All field tests were made at T = -2 C to 0 C. The maximum test velocity was 30 cm/s, and the normal pressure was of the order of 10 kPa. From the test results it is concluded that viscous ahear in the meltwater layer between ice and test plate may dominate when the test plate is very smooth, as proposed by Oksanen in his analytical model, but when the material roughness increases, mechanical shear of the ice crystals dominates.

FRAZIL ICE MEASUREMENTS IN CREEK'S FLUME FACILITY.

Daly, S.F., et al, IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.1, 1986, p.427-438, 9 refs. Colbeck, S.C.

FRAZIL ICE, PARTICLE SIZE DISTRIBUTION, ICE GROWTH, ICE CRYSTAL NUCLEI, ICE ME-

In a series of recent experiments the dynamic size distribution In a series of recent experiments the dynamic size distribution and concentration of frazil ice crystals were measured in the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) refrigerated flume facility. These data were found using a crystal imaging system developed at CRREL. The imaging system consists of a circular fiber-optic strobe light, a microscope, and either a high resolution television camera and monitor or a 35 mm camera. The system can observe crystal sizes ranging from 30 micrometers to exacted millimeters. This system was attached to a movable the flume. A series of experiments several minimeters. In a system was attached to a movable carriage mounted on the flume. A series of experiments were performed. In each experiment, the size distribution of the frazii crystals was measured as it developed along the length of the flume. The slope of the flume and the bottom roughness of the flume were varied to provide a range of hydraulic conditions. Supercooling levels of 0.01 C to 0.04 C were achieved in the flume and held constant for several hours.

MP 2128

PRELIMINARY STUDY OF A STRUCTURE TO FORM AN ICE COVER ON RIVER RAPIDS DURING WINTER.

Perham, R.B., IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.1, 1986, p.439-450, 9 refs.

ICE GROWTH, ICE COVER, FRAZIL ICE, HY-DRAULIC STRUCTURES, ICE DAMS, RIVER ICE, COUNTERMEASURES, FLOODING, TESTS, ICE BOOMS.

TESTS, ICE BOOMS.

The concept of using a trash-rack-like fence across a river to form an overflow weir by accumulating frazil ice was studied. The main purpose of the structure is to create an upstream pool on which a smooth ice cover can form. Laboratory tests in a refrigerated flume provided structural stability guidance and some frazil accumulation experience, with the latter being somewhat inconclusive. Field tests were conducted using a 19-m-long by 1.22-m-high fence boom across two approximately 17-m-wide rivers, one in New Hampshire and one in Vermont.

SUB-ICE CHANNELS AND LONGITUDINAL FRAZIL BARS, ICE-COVERED TANANA RIV-ER, ALASKA.

Lawson, D.E., et al, IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.1, (1986), p.465-474, 6 refs. Chacho, E.F., Brockett, B.E.

40-4566

FLOW, SUBGLACIAL DRAINAGE, CHANNELS (WATERWAYS), FRAZIL ICE, RIVER ICE, ICEBOUND RIVERS, ICE BOTTOM SURFACE, SEDIMENT TRANSPORT, VELOCI-UNITED STATES—ALASKA-RIVER.

Repetitive surveys and measurements from 1983 through 1986 of the ice-covered Tanana River near Pairbanks, Alaska, have shown that flow occurs in sub-ice channels that are have shown that flow occurs in sub-ice channels that are separated by longitudinal bars composed of stratified, partly consolidated frazil ice of varying type and distribution. In contrast to hanging dams, these frazil bars extend up- and downstream parallel to flow as well as from the base of the ice cover to the bed, and act as lateral walls for the sub-ice channels. Individual sub-ice channels may branch and require, thus forming a braided pattern beneath the ice cover. Longitudinal frazil bars apparently develop at locations characterized by lower velocities, such as where currents are diverted by irregularities in the bed or in the base of the ice cover.

PRAZIL ICE PEBBLES: FRAZIL ICE AGGREGATES IN THE TANANA RIVER NEAR FAIR-BANKS, ALASKA.

BANES, ALASKA.
Chacho, E.F., et al, IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.1, 1986, p.475-483, 4 refs.
Lawson, D.E., Brockett, B.E.
40-4567
FRAZIL ICE, ICE MECHANICS, ICE GROWTH,
ACCOMP

AGGREGATES, GRAIN SIZE, ABRASION, UNITED STATES—ALASKA—TANANA RIVER. UNITED STATES—ALASKA—TANANA RIVER. A unique form of frazil ice aggregate, the frazil ice pebble, occurs in large quantities in the Tanana River near Pairbanka, Alaska. Frazil pebbles consist of a mixture of individual particles, including other aggregates, which are bound together to form a consolidated, compact mass that is similar in appearance to water-worn stream pebbles. Frazil pebbles have been found incorporated into the ice cover, in transport beneath the ice cover and in frazil deposits. They range in length from less than 5 mm to greater than 150 mm. Internally, grains composing the frazil pebbles do not possess a preferred C-axis orientation, but appear to show an alignment related to grain size and shape.

MP 2131 POTENTIAL SOLUTION TO ICE JAM FLOOD-ING: SALMON RIVER, IDAHO.

Barickson, J., et al, IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.2, 1986, p.15-25, 10 refs. Zufelt, J.E.

TROL, DESIGN, ICE BOOMS, UNITED STATES
—IDAHO—SALMON RIVER.

—IDAHO—SALMON RIVER.

The uppermost 140 miles of the Salmon River generates great quantities of frazil ice throughout Idaho's cold winters. A freeze-up ice jam forms at a slackwater region 27 miles downstream of the city of Salmon, Idaho every winter, and often progresses upstream to the city. As the ice jam moves through Salmon, the river level can rise 6 to 8 feet and cause extensive flooding. Flooding has occurred at least 32 times since 1900, and the 1982 flood caused \$1,000,000 in damages.

MP 2132 DESIGN AND MODEL TESTING OF A RIVER

Tatinclaux, J.C., IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.2, City, Aug. 18-22, 198 (1986), p.137-150, 16 refs. 40-4591

40-4591
ICE NAVIGATION, RIVER ICE, ICE CONDITIONS, ICE BREAKING, DESIGN, DAMS, LOCKS (WATERWAYS), MODELS, TESTS.
One of the tests in the Corps of Engineers River Ice Management (RIM) program is to develop an ice prow capable of creating nearly ice-free channels in the vicinity of locks and dams on the Illinois and Ohio Rivers. Based on a literature survey the selected concept was that of a barge type attachment to be mounted ahead of a towboat. The prow is equipped with ice knives, and has a gently sloping bottom equipped with deflector vanes. The paper presents the results of model resistance tests which served to select the vane configuration and number of ice knives. A prototype of the prow is under final design for construction; field testing and demonstration are acheduled for winter 1986-87.

BUBBLERS AND PUMPS FOR MELTING ICE. Ashton, G.D., IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.2, 1986, p.223-234, 8 refs.

ICE MELTING, BUBBLING, WATER TEMPERATURE, PUMPS, WATER FLOW, HYDRAULIC JETS, ANALYSIS (MATHEMATICS).

JEIS, ANALYSIS (MATHEMATICS).

Air bubbling systems and submerged pumps have both been used to induce a jet-like flow of warm water against the underside of ice sheets resulting in ice melting. The mechanics of sir bubbling systems for this purpose has been analyzed previously and analytical methods are available to evaluate their effectiveness. A similar analysis of the melting caused by pump systems is presented. A comparison of the effectiveness of bubblers and pumps is made in terms of power. Finally the advantages and disadvantages of the two kinds of systems are contrasted.

FLEXURAL AND BUCELING FAILURE OF FLOATING ICE SHEETS AGAINST STRUC-

Sodhi, D.S., IAHR Symposium on Ice, 8th, Iowa City, Aug. 18-22, 1986. Proceedings, Vol.2, [1986], p.339-359, Refs. p.356-359. 40-4604

FLOATING ICE, ICE STRENGTH, OFFSHORE STRUCTURES, FLEXURAL STRENGTH, ICE
PRESSURE, ICE SOLID INTERFACE, ICE
DEFORMATION, ICE SHEETS, STRESSES, ICE
COVER THICKNESS, ICE ADHESION.

COVER THICKNESS, ICE ADHESION.
This is a review of work on bending and buckling failure of floating ice sheets, along with the forces generated during ice structure interaction.

The focus is on the work published after 1980. Estimation of ice forces as a result of bending and buckling failure of an ice sheet can be made with a fair degree of confidence when the ice structure interaction of multimodal failure of floating ice sheets needs further study.

MP 2135

COLD CLIMATE UTILITIES MANUAL. Smith, D.W., ed, Montreal, Canadian Society of Civil Engineering, 1986, var.p., Refs. passim. Reed, S.C. 40-4633

COLD WEATHER CONSTRUCTION, COLD WEATHER OPERATION, ENGINEERING, UTILITIES, WATER TREATMENT, WASTE DISPOSAL, PIPELINES, HEAT LOSS, MANUALS, ENVIRONMENTAL PROTECTION.

MP 2136 SEA ICE PROPERTIES.

SEA ICE PROPERTIES.
Tucker, WB., III, et al, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Oct. 1984, SR 84-29, MIZEX: a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 5: MIZEX 84 summer experiment PI preliminary reports. Edited by O.M. Johannesses and D.A. Horn, 182-38, A.D.A. 148, 886. ressen and D.A. Horn, p.82-83, ADA-148 986. Gow, A.J., Weeks, W.F. 40-4700

ICE PHYSICS, SEA ICE, ICE CORES, ICE FLOES, ICE STRUCTURE, ICE SAMPLING, ABLATION, SNOW COVER EFFECT.

MP 2137
IN-SITU THERMOCONDUCTIVITY MEAS-

Faucher, M., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, 1986, SR 86-01, Technology transfer opportunities for the construction engineering community: meterials and diagnostica, p.13-14, ADA-166 360.

THERMAL CONDUCTIVITY, THERMISTORS, SOIL PHYSICS, CONSTRUCTION MATERIALS, MEASURING INSTRUMENTS.

MP 2138

ROOF BLISTER VALVE.

Korhonen, C., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, 1986, SR 86-01, Technology transfer opportunities for the construction engineering community: materials and diagnostics, p.29-31, ADA-166 360.

ROOFS, LEAKAGE, DAMAGE, COUNTER-MEASURES, WEATHERING.

MEASURES, WEATHERING.
MP 2139
AIRBORNE ROOF MOISTURE SURVEYS.
Tobiasson, W., U.S. Army Cold Regions Research and
Engineering Laboratory. Special report, 1926, 3R
86-01, Technology transfer opportunities for the construction engineering community: materials and diagnostica, p.45-47, ADA-166 360.
40-4707
ROOFS, MOISTURE DETECTION, AIRBORNE
EQUIPMENT, MAINTENANCE.

MP 2140 PROTECTED MEMBRANE ROOFING SYS-TEMS.

TEMS.
Tobiasson, W., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, 1986, SR 86-01, Technology transfer opportunities for the construction engineering community: materials and diagnostics, p.49-50, ADA-166 360.
40-4708
POODE INSULATION PROTECTION SOLAR

ROOFS, INSULATION, PROTECTION, SOLAR RADIATION, DRAINAGE, DAMAGE.

Assoc, H.W.C. Management of power plant waste heat in cold of	egions	Height variation along sea ice pressure ridges and the proba- bility of finding "holes" for vehicle crossings [1975, p.191-	Surface roughness of Ross Sea pack ice [1983, p.123-124] MIP 1764
(1975, p.22-24) M	P 942	199] MP 848 Thickness and roughness variations of arctic multiyear sea ice	Atmospheric boundary-layer modification, drag coefficient, and surface heat flux in the antarctic marginal ice zone
Thermal energy and the environment (1975, 3p. + 2p. finds) MP		[1976, 25p.] CR 76-18 Misgivings on isostatic imbalance as a mechanism for sea ice	[1984, p.649-661] MP 1667 West antarctic sea ice [1984, p.88-95] MP 1818
Protected membrane roofs in cold regions [1976, 27p. CR. Utility distribution systems in Iceland [1976, 63p.]	76-02	cracking [1976, p.85-94] MP 1379 Antarctic sea ice dynamics and its possible climatic effects	Antarctic sea ice microwave signatures and their correlation with in situ ice observations [1984, p.662-672]
SE Long distance heat transmission with steam and hot	76-05	[1976, p.53-76] MIP 1378 Review of Ice Physics by P.V. Hobbs [1977, p.341-342]	MP 1668 Morphology and ecology of diatoms in sea ice from the Wed-
(1976, 39p. ₃ M	IP 938	MP 937 De-icing of radomes and lock walls using pneumatic devices	dell Sea [1984, 41p.] CR 84-05 Sea ice structure and biological activity in the antarctic mar-
Utility distribution systems in Sweden, Finland, Norwi England (1976, 121p.) SE	76-16	[1977, p.467-478] MP 1064	ginal ice zone [1984, p.2087-2095] MP 1701
Utility distribution practices in northern Europe [1977, 95] M	p.70- I P 928	Laboratory experiments on lock wall deicing using pneumatic devices (1977, p.53-68) MP 974	Variation of the drag coefficient across the Antarctic marginal ice zone g1984, p.63-71; MP 1784
Ice engineering complex adopts heat pump energy a	system	Sea ice studies in the Weddell Sea region aboard USCGC Burton Island (1977, p.172-173) MP 1014	Sea ice data buoys in the Weddell Sea [1984, 18p.] CR 84-11
[1977, p.25-26] M Ice engineering facility heated with a central heat pum	LP 89 3 ap sys-	Comparison between derived internal dielectric properties	Combined icing and wind loads on a simulated power line test span [1984, 7p.] MP 2114
tem [1977, 4p.] M Observation and analysis of protected membrane roofs	IP 939 DR SV8-	and radio-echo sounding records of the ice sheet at Cape Folger, Antarctica [1978, 12p.] CER 78-84	Simple boom assembly for the shipboard deployment of air-
tems (1977, 40p.) CIR	77-11	Primary productivity in sea ice of the Weddell region [1978, 17p.] CR 78-19	sea interaction instruments (1984, p.227-237) MP 1752
	77-21	Sea ice and ice algae relationships in the Weddell Sea [1978, p.70-71] MP 1203	Sea ice microbial communities in Antarctica [1986, p.243-250] MP 2026
Heat transmission with steam and hot water [1978, p.17 ME	-23 ₁ P 1 95 6	Measurement of mesoscale deformation of Besufort sea ice	Conductor twisting resistance effects on ice build-up and ice shedding [1986, 8p. + figs.] MP 2108
Abele, G.	erietice	(AIDJEX-1971) [1978, p.148-172] MP 1179 Numerical simulation of atmospheric ice accretion [1979,	Communication tower icing in the New England region
Portable instrument for determining snow characteristed to trafficability [1972, p.193-204]	IP 886	p.44-52 ₁ MP 1235 Laboratory experiments on icing of rotating blades 1979,	[1986, 7p.] MIP 2109 Adams, W.P.
Some effects of air cushion vehicle operations on deep [1972, p.214-241] M	p snow IP 887	p.85-92 ₁ MP 1236	Techniques for measurement of snow and ice on freshwater [1986, p.174-222] MP 2000
Methods of measuring the strength of natural and pro	cessed P 1058	Standing crop of algae in the sea ice of the Weddell Sea region [1979, p.269-281] MP 1242	Adley, M.D.
Effects of hovercraft, wheeled and tracked vehicle tra	ffic on	Computer modeling of atmospheric ice accretion (1979, 36p.) CR 79-04	Experimental determination of buckling loads of cracked ice sheets [1984, p.183-186] MP 1687
Compressibility characteristics of compacted snow [P 1123 1976,	Ice sheet internal radio-echo reflections and associated physical property changes with depth [1979, p.5675-5680]	Buckling analysis of cracked, floating ice sheets 1984, 28p.; SE 84-23
47p. ₁ CR Arctic transportation: operational and environmental e	76-21	MP 1319	Adrian, D.D.
tion of an air cushion vehicle in Northern Alaska (1976, IP 894	Drifting buoy measurements on Weddell Sea pack ice 1979, p.106-108; MP 1339	Rational design of overland flow systems [1980, p.114-121] MP 1400
Hovercraft ground contact directional control devices	1976,	Mass-balance aspects of Weddell Sea pack-ice (1979, p.391-405) MP 1286	Aitken, G.W. Baseplate design and performance: mortar stability report
p.51-59; M Air cushion vehicle ground contact directional contr	IP \$75 rol de-	Modeling of anisotropic electromagnetic reflection from sea ice [1980, p.247-294] MP 1325	
vices [1976, 15p.] CR Arctic transportation: operational and environmental e	76-45 evalus-	Modeling of anisotropic electromagnetic reflection from sea	Terminal ballistics in cold regions materials [1978, 6p.] MP 1182
tion of an air cushion vehicle in northern Alaska	1977, IP 985	ice [1980, 15p.] CR 80-23 Sea ice studies in the Weddell Sea aboard USCGC Polar Sea	Impact fuse performance in snow (Initial evaluation of a new test technique) [1980, p.31-45] MP 1347
Runway site survey, Pensacola Mountains, Anti	arctica	[1980, p.84-96] MP 1431 Sea-ice atmosphere interactions in the Weddell Sea using	Dynamic testing of free field stress gages in frozen soil [1980, 26p.] SE 80-30
Effects of low ground pressure vehicle traffic on tur		drifting buoys [1981, p.177-191] MP 1427 Review of sea-ice weather relationships in the Southern Hem-	SNOW-ONE-A; Data report [1982, 641p.] SR 82-08 Optical engineering for cold environments [1983, 225p.]
Lonely, Alaska [1977, 32p.] SR Mass water balance during spray irrigation with wastew	: 77-31 rater at	isphere [1981, p.127-159] MP 1426	MP 1646
Deer Creek Lake land treatment site [1978, 43p.]	79-29	Modeling of anisotropic electromagnetic reflections from sea ice (1981, p.8107-8116) MP 1469	Utilization of the snow field test series results for development of a snow obscuration primer [1983, p.209-217]
Effects of winter military operations on cold regions		Physical and structural characteristics of sea ice in McMurdo Sound [1981, p.94-95] MP 1542	MP 1692 Albert, D.G.
Effects of low ground pressure vehicle traffic on tur	adra at	Growth, structure, and properties of sea ice [1982, 130p.] M \$2-01	Dynamic testing of free field stress gages in frozen soil [1980, 26p.] SE 80-30
Lonely, Alaska (1978, 63p.) SE Effect of water content on the compressibility of snow	l 78-16 /-water	On the differences in ablation seasons of arctic and antarctic	Impact fuse performance in anow (Initial evaluation of a new test technique) [1980, p.31-45] MP 1347
	t 7 9-0 2	On modeling the Weddell Sea pack ice [1982, p.125-130]	Seismic site characterization techniques applied to the NATO
Clarence Cannon Dam, Mo; and Deer Creek Lake,		MP 1549 Physical and structural characteristics of antsrctic sea ice	RSG-11 test site in Munater Nord, Federal Republic of Germany [1982, 33p.] CR 82-17
Hydraulic characteristics of the Deer Creek Lake land	d treat-	(1982, p.113-117) MP 1548 On the differences in ablation seasons of Arctic and Antarctic	Deceleration of projectiles in snow [1982, 29p.] CR 82-20
ment site during wastewater application [1981, 37p).] t 81-07	sea ice (1982, 9p.) CR 82-33	Review of the propagation of inelastic pressure waves in snow [1983, 26p.] CR #3-13
Ecological impact of wheeled, tracked, and air cushio- cle traffic on tundra (1981, p.11-37) MI	n vehi- P 1463	Physical, chemical and biological properties of winter sea ice in the Weddell Sea (1982, p.107-109) MP 1669	Effects of snow on vehicle-generated seismic signatures
Analysis of infiltration results at a proposed North C		Observations of pack ice properties in the Weddell Sea [1982, p.105-106] MP 1608	[1984, p.83-109] MP 2974 Effect of snow on vehicle-generated seismic signatures
Long-term effects of off-road vehicle traffic on tundra	terrain	Reports of the U.SU.S.S.R. Weddell Polynya Expedition, October-November 1981, Volume 5, Sea ice observations	(1984, 24P.) CR 84-23 Albert, M.R.
• • • • • • • • • • • • • • • • • • • •	P 1820 P 2024	[1983, 6p. + 59p.] SR 83-2	Computer models for two-dimensional transient heat conduc-
Acevedo, W.		Numerical simulation of the Weddell Sea pack ice (1983, p.2873-2887) MP 1892	Computer models for two-dimensional steady-state heat con-
Landaat-assisted environmental mapping in the Arctional Wildlife Refuge, Alaska (1982, 59p. + 2 ma	ipe ₃	Recent advances in understanding the structure, properties, and behavior of sea ice in the coastal zones of the polar	duction [1983, 90p.] CR 83-10 2-d transient freezing in a pipe with turbulent flow, using a
Acharya, H.K.	K 82-37	oceans (1983, p.25-41; MP 1604 Mechanisms for ice bonding in wet snow accretions on power	continually deforming meah with finite elements (1983, p.102-112) MP 1893
Surface-wave dispersion in Byrd Land, Antarctica p.955-959; N	(1972, AP 992	lines [1983, p.25-30] MP 1633	Modeling two-dimensional freezing using transfinite map- pings and a moving-mesh finite element technique [1984,
		Field measurements of combined icing and wind loads on wires (1983, p.205-215) MP 1637	45p. ₃ CR 84-10
Actierments, N.L. Mechanics of ice jam formation in rivers (1983, 14p. CS	.] R 83- 31	Simple boom assembly for the shipboard deployment of air- sea interaction instruments [1983, 14p.] SR 83-28	Computation of porous media natural convection flow and phase change [1984, p.213-229] MP 1895
Ackleson, S.G. Comparison of SPOT simulator data with Landset M		Effect of X-ray irradiation on internal friction and dielectric relaxation of ice [1983, p.4314-4317] MP 1670	Alexander, M. Preliminary investigations of the kinetics of nitrogen transfor-
agery for delineating water masses in Delaware Bay, kill River, and adjacent wetlands (1985, p.1123-11)	Broad-	Physical mechanism for establishing algal populations in frazil	mation and nitroamine formation in land treatment of was- tewater (1979, 59p) SR 79-04
M	P 1909	ice [1983, p.363-365] MP 1717 Relative abundance of diatoms in Weddell Sea pack ice	Alexander, V.
Ackley, S.F. Meso-scale strain measurements on the Beaufourt se	e pack	[1983, p.181-182] MP 1786 Blemental compositions and concentrations of micros-	Ice engineering facility [1983, 12p. + fig.] MP 2008 Alger, G.R.
ice (AIDJEX 1971) [1974, p.119-138] M	P 1035 AP 844	pherules in snow and pack ice from the Weddell Sea [1983, p.128-131] MP 1777	loe and navigation related sedimentation (1978, p.393-403) MP 1133
- · · · · · · · · · · · · · · · · · · ·			

Alkiro, B.D.	Sensible and latent heat fluxes and humidity profiles following	Some field studies of the correlation between electromagnetic
Winter earthwork construction in Upper Michigan [1977, 59p.] SER 77-40	a step change in surface moisture [1982, 18p.]	and direct current measurements of ground resistivity [1982, p.92-110] MP 1513
Increasing the effectiveness of soil compaction at below-freez-	On the differences in ablation seasons of Arctic and Antarctic	Measurement of ground dielectric properties using wide-angle
ing temperatures [1978, 58p.] SR 78-25	sea ice [1982, 9p.] CR 82-33	reflection and refraction [1982, 11p.] CR 82-06
Alley, R.B.	Atmospheric boundary layer measurements in the Weddell	Laboratory measurements of soil electric properties between
Calculating borehole geometry from standard measurements	Sea [1982, p.113-115] MP 1610 Comment on 'Water drag coefficient of first-year sea ice' by	0.1 and 5 GHz [1982, 12p.] CR 82-10 Improving electric grounding in frozen materials [1982,
of borehole inclinametry [1984, 18p.] SR 84-15 Rheology of glacier ice [1985, p.1335-1337] MP 1844	M.P. Langieben [1983, p.779-782] MP 1577	12p. ₁ SR 82-13
Alter, A.J.	Reports of the U.SU.S.S.R. Weddell Polynya Expedition,	Dielectric properties of thawed active layers overlying perma-
Waste management in the north r1974, p.14-21;	October-November 1981 Volume 7: Surface-level meteoro-	frost using radar at VHF [1982, p.618-626] MP 1547
MP 1048	logical data [1983, 32p.] SR 83-14	Electrical properties of frozen ground at VHF near Point Bar-
Alverson, K.	Reports of the U.SU.S.S.R. Weddell Polynya Expedition, October-November 1981, Volume 6: Upper-air data [1983,	row, Alaska (1982, p.485-492) MP 1572 Radar profiling of buried reflectors and the groundwater table
MIZEX 84 mesoscale sea ice dynamics: post operations re-	288p.j SR 83-13	(1983, 16p.) CR 83-11
port (1984, p.66-69) MP 1287 Ambech, W.	Atmospheric turbulence measurements at SNOW-ONE-B	Dielectric measurements of frozen silt using time domain re-
Study of water drainage from columns of snow [1979, 19p.]	[1983, p.81-87] MP 1846	flectometry [1984, p.39-46] MIP 1775
CR 79-01	Simple boom assembly for the shipboard deployment of air- ses interaction instruments (1983, 14p.) SR 83-28	Field dielectric measurements of frozen ailt using VHF pulses
Andess, E.L.	Atmospheric boundary-layer modification, drag coefficient,	[1984, p.29-37] MP 1774 Conductive backfill for improving electrical grounding in
Byaluation of Vaisala's MicroCORA Automatic Sounding	and surface heat flux in the antarctic marginal ice zone	frozen soils (1984, 19p.) SR 84-17
System [1982, 17p.] CR 82-28 Anderson, B.G.	[1984, p.649-661] MP 1667	Pulse transmission through frozen silt [1984, 9p.]
International Workshop on the Seasonal Sea Ice Zone, Mon-	Variation of the drag coefficient across the Antarctic marginal ice zone [1984, p.63-71] MP 1784	CR 84-17
terey, California, Feb. 26-Mar.1, 1979 (1980, 357p.)	Simple boom assembly for the shipboard deployment of air-	Large-size coaxial waveguide time domain reflectometry unit for field use [1984, p.428-431] MP 2048
MIP 1292	sea interaction instruments [1984, p.227-237]	for field use [1984, p.428-431] MP 2048 Field observations of electromagnetic pulse propagation in
Anderson, D.M.	MP 1752	dielectric slabs [1984, p.1763-1773] MP 1991
Arctic and Subarctic environmental analyses utilizing ERTS-	New method for measuring the anow-surface temperature	Radar investigations above the trans-Alsaka pipeline near
1 imagery; bimonthly progress report, 23 June - 23 Aug. 1972 (1972, 3p.) MP 991	[1984, p.161-169] MP 1867	Fairbanks [1984, 15p.] CR 84-27
Arctic and subarctic environmental analysis [1972, p.28-	Heat and moisture advection over antarctic sea ice [1985, p.736-746] MP 1888	Discussion: Electromagnetic properties of sea ice by R.M.
30 ₁ MP 1119	Energy exchange over antarctic sea ice in the spring [1985,	Morey, A. Kovacs and G.F.N. Cox [1984, p.93-94] MP 1821
Ionic migration and weathering in frozen Antarctic soils	p.7199-7212 ₁ MIP 1889	Detection of buried utilities. Review of available methods
(1973, p.461-470) MP 941	Calibrating cylindrical hot-film anemometer sensors (1986,	and a comparative field study [1984, 36p.] CR 84-31
Arctic and subsectic environmental analyses using BRTS-1	p.283-298 ₁ MP 1860	Mapping resistive seabed features using DC methods (1985,
imagery. Progress report Dec. 72-June 73 [1973, 75p.] MP 1003	Andreson, M.J.	p.136-147 ₁ MP 1918
Arctic and subarctic environmental analyses utilizing ERTS-	ORIGIN AND PALEOCLIMATIC SIGNIFICANCE OF LARGE-SCALE PATTERNED GROUND IN THE	Onlyanic methods for mapping resistive seabed features
1 imagery [1973, 5p.] MP 1611	DONNELLY DOME AREA, ALASKA [1969, 87p.]	[1985, p.91-92] MP 1955 Dielectric studies of permafrost using cross-borehole VHF
Mesoscale deformation of ses ice from satellite imagery	MP 1190	pulse propagation [1985, p.3-5] MP 1951
[1973, 2p.] MP 1120	Andrews, J.T.	Dielectric properties at 4.75 GHz of saline ice slabs (1985,
Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Bimenthly progress report, 23 Aug 23 Oct.	Environmental and societal consequences of a possible CO2-	p.83-86 ₁ MP 1911
1973 [1973, 3p.] MIP 1030	induced climate change: Volume 2, Part 3—Influence of short-term climate fluctuations on permafrost terrain	Preliminary investigations of mine detection in cold regions
Arctic and subarctic environmental analyses utilizing ERTS-	[1982, 30p.1 MP 1546	using short-pulse radar (1985, 16p.) SR 85-23
1 imagery. Bimonthly progress report, 23 Oct 23 Dec.	Andrews, M.	Arctic Institute of North America
1973 [1973, 6p.] MIP 1031	Selected bibliography of disturbance and restoration of soils	Analysis of environmental factors affecting army operations in the Arctic Basin [1962, 11p.] MP 984
Arctic and subarctic environmental analysis utilizing ERTS- 1 imagery. Final report June 1972-Peb. 1974 (1974,	and vegetation in permafrost regions of the USSR (1970- 1976) [1977, 116p.] SR 77-87	Arice, D.N.
128p.j MP 1047	1976) [1977, 116p.] SM 77-67 Selected bibliography of disturbance and restoration of soils	Review of techniques for measuring soil moisture in situ
New England reservoir management: Land use/vegetation	and vegetation in permafrost regions of the USSR (1970-	[1980, 17p.] SR 80-31
mapping in reservoir management (Merrimack River basin)	1977) [1978, 175p.] SR 78-19	Ashibae, C.E.
[1974, 30p.] MP 1039	Алио, Ү.	Haines-Fairbanks pipeline: design, construction and opera-
Near real time hydrologic data acquisition utilizing the	Modelling a snowdrift by means of activated clay particles	tion [1977, 20p.] SR 77-04
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-211] MP 1055	Modelling a snowdrift by means of activated clay particles [1985, p.48-52] MP 2007	tion (1977, 20p.) SR 77-04 Ashten, G.D.
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables)	Modelling a snowdrift by means of activated clay particles [1985, p.48-52] MIP 2007 Appel, G.C.	tion (1977, 20p.) SR 77-04 Ashtea, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) MP 1723
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] MP 913	Modelling a snowdrift by means of activated clay particles [1985, p.48-52] MP 2007	tion [1977, 20p.] SR 77-04 Ashtea, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.] MP 1723 Formation of ice ripples on the underside of river ice covers
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter	tion (1977, 20p.) Ashten, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) MP 1243
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] MP 913	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218	tion (1977, 20p.) Ashten, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.] Formation of ice ripples on the underside of river ice covers [1971, 157p.] River-ice problems: a state-of-the-art survey and assessment
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Rxamining antarctic soils with a scanning electron microscope (1976, p.249-232) MP 931	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snew occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A.	tion (1977, 20p.) Ashten, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covera (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) MP 844
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Bramming sutarctic soils with a scanning electron microscope (1976, p.249-252) Msrs soil-water analyzer: instrument description and status	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p., Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcone, S.A. Airborne resistivity and magnetometer survey in northern	tion (1977, 20p.) Rabtan, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1002 Snow and ice (1975, p.435-441, 475-487) MP 844 Passage of ice at hydraulic structures (1976, p.1726-1736)
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08 Examining antarctic soils with a scanning electron microscope [1976, p.249-252] Mars soil-water analyzer: instrument description and status [1977, p.149-158]	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snew occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A.	tion (1977, 20p.) Aabten, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) MP \$66
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining anterctic soils with a scanning electron microscope (1976, p.249-252) MRs soil-water analyzer: instrument description and status (1977, p.149-158) Determination of unfrozen water in frozen soil by pulsed	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) Computer program to determine the resistance of long wires	tion (1977, 20p.) Rabtan, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) MP 956 Arching of model ice floes: Effect of mixture variation on two
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08 Examining antarctic soils with a scanning electron microscope [1976, p.249-252] Mars soil-water analyzer: instrument description and status [1977, p.149-158]	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcone, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.)	tion (1977, 20p.) Rabtan, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covers: (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.)
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining anteretic soils with a scanning electron microscope (1976, p.249-252) Mr 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1097 Antarctic soil studies using a scanning electron microscope	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02	tion (1977, 20p.) Rabtan, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) MP 945 Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) MP 936
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-2.1 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcome, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-05	tion (1977, 20p.) Rabtea, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) MP 1723 Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1002 Snow and ice (1975, p.435-441, 475-487) MP 2844 Passage of ice at hydraulic structures (1976, p.1726-1736) MP 966 Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1978, p.231-
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining anteretic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1097 Antarctic soil studies using a scanning electron microscope (1978, p.166-112) MP 1386 Water vapor adsorption by sodium montmortillonite at -5C	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic	tion (1977, 20p.) Ashten, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of air bubbler systems (1978, p.231-238)
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from iquid determinations (1976, 9p.) Raamining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 981	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permañost terrain (1977,	tion (1977, 20p.) SR 77-04 Ashtea, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) MP 1723 Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) MP 966 Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of air bubbler systems (1978, p.231-238) Isva, Greenland: glacier freezing study (1978, p.236-264)
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Rxamining antarctic soils with a scanning electron microscope (1976, p.249-252) MR 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1386 Antarctic soil studies using a scanning electron microscope (1978, p.166-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcone, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) MP 925	tion (1977, 20p.) Rabtan, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) MP 944 Passage of ice at hydraulic structures (1976, p.1726-1736) MP 956 Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of air bubbler systems (1977, p.231-238) International simulation of sir bubbler systems (1978, p.236-264) MP 1618 Isua, Greenland: glacier freezing study (1978, p.256-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978,
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1386 Water vapor assorption by sodium montmorillonite at .5C (1978, p.136-144) Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-14) MP 1210	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permañost terrain (1977,	tion (1977, 20p.) Rabtas, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Show and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes [1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1977, p.765-78) Numerical simulation of sir bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study [1978, p.236-264] MF 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) MP 1137
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08 Examining sutarctic soils with a scanning electron microscope [1976, p.249-252] MF 931 Mars soil-water analyzer: instrument description and status [1977, p.149-158] MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance [1978, p.149-155] MP 1097 Antarctic soil studies using a scanning electron microscope [1978, p.106-112] MP 1386 Water vapor adsorption by sodium montmorillonite at .5C [1978, p.638-644] Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique [1978, p.11-14] Wiking GCMS analysis of water in the Martian regolith	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) Interaction of a surface wave with a dielectric slab discon-	tion (1977, 20p.) Ashten, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) MP 1723 Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1002 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) MP 956 Arching of model ice floos: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.75-778) Numerical simulation of sir bubbler systems (1977, p.231-238) Issa, Greenland: glacier freezing study (1978, p.236-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining anteretic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1997 Anterctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.1638-644) Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-14) Viking GCMS analysis of water in the Martian regolith MP 1195 MP 1195	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56), CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.] CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LP radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) CR 78-36	tion (1977, 20p.) Ashtea, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Show and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) MP 946 Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1978, p.231-238) Isva, Greenland: glacier freezing study (1978, p.236-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.3-366)
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08 Examining sutarctic soils with a scanning electron microscope [1976, p.249-252] MF 931 Mars soil-water analyzer: instrument description and status [1977, p.149-158] MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance [1978, p.149-155] MP 1097 Antarctic soil studies using a scanning electron microscope [1978, p.106-112] MP 1386 Water vapor adsorption by sodium montmorillonite at .5C [1978, p.638-644] Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique [1978, p.11-14] Wiking GCMS analysis of water in the Martian regolith	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2067 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcome, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) MP 925 Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of perma-	tion (1977, 20p.) Aabtan, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) MP 1723 Formation of ice ripples on the underside of river ice covers [1971, 157p.] River-ice problems: a state-of-the-art survey and assessment of research needs [1974, p.1-15] MP 1002 Snow and ice (1975, p.435-441, 475-487) MP 264 Arching of model ice flows: Effect of mixture variation on two block sizes [1976, 11p.] Numerical simulation of sir bubbler systems [1977, p.765-778] Numerical simulation of sir bubbler systems [1977, p.765-778] Numerical simulation of sir bubbler systems [1978, p.231-238] Isua, Greenland: glacier freezing study [1978, p.256-264] MP 1618 Entrainment of ice flows into a submerged outlet [1978, p.291-299] Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1136
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-68 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 931 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-14) MP 1210 Viking GCMS analysis of water in the Martian regolith (1978, p.33-38) MP 1409 Low temperature phase changes in montmorillonite and non-	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Interaction of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) MP 1101	tion (1977, 20p.) Ashten, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1022 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes [1976, 11p.) NP 956 Arching of model ice floes: Effect of mixture variation on two block sizes [1976, 11p.) NP 957 Arguerical simulation of sir bubbler systems [1977, p.765-778] Numerical simulation of sir bubbler systems [1977, p.231-238] Summerical simulation of sir bubbler systems [1978, p.231-236-264] MP 1174 Entrainment of ice floes into a submerged outlet [1978, p.291-299] MP 1137 Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MF 1166 River ice [1978, p.369-392] MP 1216
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08 Examining antarctic soils with a scanning electron microscope [1976, p.249-252] MP 931 Mars soil-water analyzer: instrument description and status [1977, p.149-158] MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance [1978, p.149-155] MP 1097 Antarctic soil studies using a scanning electron microscope [1978, p.106-112] MP 1336 Water vapor adsorption by sodium montmorillonite at -5C [1978, p.638-644] Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique [1978, p.15-61] Viking GCMS analytis of water in the Martian regolith [1978, p.35-61] Analysis of water in the Martian regolith [1979, p.33-38] MP 1409 Low temperature phase changes in montmorillonite and non-trouite at high water contents and high salt contents [1980,	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosse, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.] CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency [1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) CR 78-08 Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Electrical ground impedance measurements in the United	tion (1977, 20p.) Ashtea, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Show and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes [1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of air bubbler systems (1977, p.765-778) Numerical simulation of air bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study [1978, p.236-264] MF 1178 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.363-366) MF 1160 River ice [1978, p.369-392] River ice [1979, p.38-45] MP 1178
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at -5C (1978, p.638-644) Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-14) Wiking GCMS analysis of water in the Martian regolith (1978, p.33-38) MP 1409 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents (1980, p.138-144) MP 1330	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) MP 1101 Electrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1221	tion (1977, 20p.) Ashtan, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) NP 1002 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of air bubbler systems (1978, p.231-238) Numerical simulation of air bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study (1978, p.256-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366, MP 1150 River ice (1978, p.369-392) River ice (1979, p.38-45) MP 1178 Point source bubbler systems to suppress ice (1979, 12p.) CR 79-12
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1097 Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 1310 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.15-61) Analysis of water in the Martian regolith (1979, p.33-38) MP 1319 Analysis of water in the Martian regolith (1979, p.33-38) MP 1499 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents (1980, p.139-144) MP 1300 Unfrozen water contents of submarine permafrost determined	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2067 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosse, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrook geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VIP resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LP radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) MP 925 Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted	tion (1977, 20p.) Ashtan, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) NP 1002 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of air bubbler systems (1978, p.231-238) Numerical simulation of air bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study (1978, p.256-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366, MP 1150 River ice (1978, p.369-392) River ice (1979, p.38-45) MP 1178 Point source bubbler systems to suppress ice (1979, 12p.) CR 79-12
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at -5C (1978, p.638-644) Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-14) Wiking GCMS analysis of water in the Martian regolith (1978, p.33-38) MP 1409 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents (1980, p.138-144) MP 1330	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcese, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) MP 925 Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.1399-1417) MP 1166	tion (1977, 20p.) Aabtan, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1002 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.755-778) Numerical simulation of sir bubbler systems (1977, p.231-238) Issa, Greenland: glacier freezing study (1978, p.236-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) River ice (1978, p.369-392) River ice (1978, p.369-392) River ice (1979, p.38-45) Point source bubbler systems to suppress ice (1979, 12p.) CR 79-12 Turbulent heat transfer in large aspect channels (1979, 57-13)
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 931 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1097 Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 1398 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.15-61) Analysis of water in the Martian regolith (1978, p.33-38) MP 1210 Viking GCMS analysis of water in the Martian regolith (1978, p.33-38) Analysis of water in the Martian regolith (1979, p.33-38) MP 1409 Low temperature phase changes in montmorillonite and non-tronzite at high water contents and high salt contents (1980, p.139-144) Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1336 MP 1442 Thawing of frozen clays (1985, p.1-9) MP 1923	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2067 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosse, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrook geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VIP resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LP radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) MP 925 Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted	tion (1977, 20p.) Ashtan, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) NP 1002 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of air bubbler systems (1978, p.231-238) Numerical simulation of air bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study (1978, p.256-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366, MP 1150 River ice (1978, p.369-392) River ice (1979, p.38-45) MP 1178 Point source bubbler systems to suppress ice (1979, 12p.) CR 79-12
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Rammining snaretic soils with a scanning electron microscope (1976, p.249-252) Mrs soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1097 Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillomite at -5C (1978, p.33-644) MP 981 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-14) MF 1210 Viking GCMS analysis of water in the Martian regolith (1979, p.33-38) MP 1409 Low temperature phase changes in montmorillomite and non-tronite at high water contents and high salt contents 1/900, p.139-1441 Untrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1330 Untrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1492 Andersee, E.A.	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1101 Review of electrical resistivity of frozen ground and some electromagnetic methods for its measurement (1979, p.33-37) MP 1623	tion (1977, 20p.) Ashtea, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Show and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) MP 946 Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study (1978, p.236-264) MP 1618 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) MP 1137 Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) MP 1168 River ice (1978, p.369-392) River ice (1979, p.38-45) MP 1178 Point source bubbler systems to suppress ice (1979, 12p.) CR 79-12 Turbulent heat transfer in large aspect channels (1979, 5p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26)
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 981 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.15-61) Wiking GCMS analysis of water in the Martian regolith (1978, p.55-61) Analysis of water in the Martian regolith (1979, p.33-38) MP 1409 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents (1980, p.139-144) Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1412 Thawing of frozen clays (1985, p.1-9) MP 1923 Andersee, E.A. Permeability of a melting snow cover (1982, p.904-908)	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2067 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosse, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VIP resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LP radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) MP 925 Investigation of an airborne resistivity survey conducted at very low frequency [1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz [1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine [1978, p.1399-1417] MP 1162 Review of electrical resistivity of frozen ground and some electromagnetic methods for its measurement [1979, p.32-37] Blectromagnetic geophysical survey at an interior Alaska per-	tion (1977, 20p.) Ashtes, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Show and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1977, p.765-778) Shumerical simulation of air bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study (1978, p.236-264) MF 1618 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) River ice (1978, p.369-392) River ice (1979, p.38-45) River ice (1979, p.38-45) MP 1178 Point source bubbler systems to suppress ice (1979, 12p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1335 Point source bubbler systems to suppress ice (1979, 197, p.335-100) MP 1326
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] Rammining antarctic soils with a scanning electron microscope [1976, p.249-252] Mars soil-water analyzer: instrument description and status [1977, p.149-158] Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance [1978, p.149-155] MP 912 Antarctic soil studies using a scanning electron microscope [1978, p.106-112] Water vapor adsorption by sodium montmorillonite at .5C (1978, p.538-644) Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique [1978, p.11-4] Viking GCMS analysis of water in the Martian regolith [1979, p.33-38] Analysis of water in the Martian regolith [1979, p.33-38] MP 1409 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1336 MP 1430 Law temperature phase changes in montmorillonite and non-tronite at high water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Thawing of frozen clays [1985, p.1-9] Andersee, E.A. Permeability of a melting snow cover [1982, p.904-908, MP 1565	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcese, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) MP 925 Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz [1978, 92p.] MP 1021 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.1399-1417) MP 1126 Review of electrical resistivity of frozen ground and some electromagnetic methods for its measurement (1979, p.32-37) Blectromagnetic geophysical survey at an interior Alaska permafrost exposure (1979, 7b.) SR 79-14	tion (1977, 20p.) Aabten, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1022 Show and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1978, p.231-238) Isva, Greenland: glacier freezing study (1978, p.256-264, MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) River ice (1978, p.369-392) MP 1168 River ice (1979, p.38-45) Point source bubbler systems to suppress ice (1979, 12p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1335 Point source bubbler systems to suppress ice (1979, p.93-100) MP 1336 Suppression of river ice by thermal effluents (1979, 29p.)
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from inquid determinations (1976, 9p.) Prediction of unfrozen water contents in frozen soils from inquid determinations (1976, 9p.) Mrs soil-water analyzer: instrument description and status (1977, p.149-158) Mrs soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-14) Viking GCMS analysis of water in the Martian regolith (1978, p.33-38) MP 1410 Low temperature phase changes in montmorillonite and nontronite at high water contents and high salt contents (1980, p.139-144) Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1336 MP 1432 Thawing of frozen clays (1985, p.1-9) MP 1923 Andersen, E.A. Permeability of a melting snow cover (1982, p.904-908) MP 1565	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2067 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosse, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.] CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LF rediowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) CR 78-06 Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.139-1417) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.139-1417) MP 1221 Electromagnetic methods for its measurement (1979, p.32-37) Electromagnetic geophysical survey at an interior Alaska permafrost exposure (1979, 7p.) Electrod of Arctic water supplies with geophysical tech-	tion (1977, 20p.) Aabtan, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice [1975, p.435-441, 475-487] MP 844 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two lock sizes [1976, 11p.] MP 956 Arching of model ice floes: Effect of mixture variation on two CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1978, p.231-238) Numerical simulation of sir bubbler systems (1978, p.236-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) MP 1137 Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) MP 1168 River ice (1978, p.369-392) River ice (1979, p.38-45) Point source bubbler systems to suppress ice (1979, 12p.) CR 79-12 Turbulent heat transfer in large aspect channels (1979, 5p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1335 Point source bubbler systems to suppress ice (1979, p.93-100) CR 79-30
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] MP 913 Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08 Examining antarctic soils with a scanning electron microscope [1976, p.249-252] Mrs. MP 931 Mrs. soil-water analyzer: instrument description and status [1977, p.149-158] MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance [1978, p.149-155] MP 1097 Antarctic soil studies using a scanning electron microscope [1978, p.106-112] MP 1336 Water vapor adsorption by sodium montmorillonite at .5C [1978, p.538-644] Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique [1978, p.11-14] Viking GCMS analytis of water in the Martian regolith [1979, p.33-38] Analysis of water in the Martian regolith [1979, p.33-38] MP 1409 Low temperature phase changes in montmorillonite and non-tronite at high water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1340 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Thawing of frozen clays [1985, p.1-9] Andersen, E.A. Permeability of a melting snow cover [1982, p.904-908, MP 1936 Andersen, S. Wildlife habitat mapping in Lac qui Parle, Minnesota [1984, p.205-208] MP 2065-	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2007 Appel, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) MP 925 Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1101 Review of electrical resistivity of frozen ground and some electromagnetic methods for its measurement (1979, p.32-37) Blectromagnetic geophysical survey at an interior Alsaka permafrost exposure (1979, 7p.) SR 79-14 Detection of Arctic water supplies with geophysical techniques (1979, 30p.) Delineation and engineering characteristics of permafrost	tion (1977, 20p.) Aabtea, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) MP 946 Arching of model ice floes: Effect of mixture variation on two block sizes [1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study (1978, p.256-644) MF 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) River ice (1979, p.38-45) River ice (1979, p.38-45) River ice (1979, p.38-45) River ice (1979, p.38-45) MP 1169 River ice (1979, p.38-45) MP 1174 Point source bubbler systems to suppress ice (1979, 12p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1335 Point source bubbler systems to suppress ice (1979, p.93-100) MP 1326 Suppression of river ice by thermal effluents (1979, 23p.) CR 79-30 Proceedings of the Specialty Conference on Computer and
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-21) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) MP 913 Prediction of unfrozen water contents in frozen soils from inquid determinations (1976, 9p.) MP 913 Prediction of unfrozen water contents in frozen soils from inquid determinations (1976, 9p.) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 932 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1697 Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 981 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-149) Viking GCMS analysis of water in the Martian regolith (1979, p.33-38) MP 1412 Viking GCMS analysis of water in the Martian regolith (1979, p.33-38) MP 1499 Low temperature phase changes in montmorillonite and nontronite at high water contents and high salt contents (1980, p.139-144) Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1330 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1923 Andersee, E.A. Permeability of a melting snow cover (1982, p.904-908, MP 1565 Andrese, S. Wildlife habitat mapping in Lac qui Parle, Minnesota (1984, p.205-208)	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) MP 2067 Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosse, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permarfrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) CR 78-06 Shallow electromagnetic geophysical investigations of permarfrost (1978, p.501-507) MP 1101 Blectrical ground impedance measurements in the United States between 200 and 415 kHz [1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.1399-1417) MP 1166 Review of electrical resistivity of frozen ground and some electromagnetic methods for its measurement [1979, p.32-37] Blectrical resistivity of frozen ground and some electromagnetic geophysical survey at an interior Alaska permarost exposure (1979, 7p.) Electrical of Arctic water supplies with geophysical techniques (1979, 30p.) Detection of Arctic water supplies with geophysical techniques (1979, 30p.) Delication and engineering characteristics of permafrost beneath the Besufort Sea [1979, p.33-115] MP 1287	tion (1977, 20p.) Ashtes, G.D. Temperature and flow conditions during the formation of river ice (1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Show and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of air bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study (1978, p.236-264) MP 1178 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) MP 1158 River ice (1978, p.369-392) River ice (1979, p.38-45) MP 1178 Point source bubbler systems to suppress ice (1979, 12p.) CR 79-12 Turbulent heat transfer in large aspect channels (1979, 5p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1336 Suppression of river ice by thermal effluents (1979, 23p.) CR 79-30 Proceedings of the Specialty Conference on Computer and Physical Modeling in Hydraulic Engineering (1980, 492p.) MP 1321
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-21) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) Mr 1931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1097 Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 1398 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.15-61) Analysis of water in the Martian regolith (1979, p.33-38) MP 1419 Viking GCMS analysis of water in the Martian regolith (1978, p.55-61) Analysis of water in the Martian regolith (1979, p.33-38) MP 1419 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents (1980, p.139-144) Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1312 Andersea, E.A. Permeability of a melting snow cover (1982, p.904-908) MP 1565 Amdreas, E.L. Turbulent heat flux from Arctic leads (1979, p.57-91)	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosa, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne V.F. resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LP radiowave and magnetic induction resistivity units over permarrost terrain (1977, p.39-42) Interaction of an airborne resistivity survey conducted at very low frequency (1977, 48p.) Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permarrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1101 Review of electrical resistivity of frozen ground and some electromagnetic geophysical survey at an interior Alaska permarrost exposure (1978, p.1399-1417) MP 1623 Blectromagnetic geophysical survey at an interior Alaska permarrost exposure (1979, 30p.) SR 79-14 Detection of Arctic water supplies with geophysical techniques (1979, 30p.) RF 9-15 Delineation and engineering characteristics of permarrost beneath the Beautiort Sea (1979, p.93-115) MF 1287	tion (1977, 20p.) Aabten, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) MP 1723 Formation of ice ripples on the underside of river ice covers [1971, 157p.] River-ice problems: a state-of-the-art survey and assessment of research needs [1974, p.1-15] MP 1002 Snow and ice (1975, p.435-441, 475-487) MP 264 Arching of model ice floes: Effect of mixture variation on two block sizes [1976, 11p.) Arching of model ice floes: Effect of mixture variation on two block sizes [1976, 11p.) MP 936 Arching of model ice floes: Effect of sixture variation on two block sizes [1976, 11p.) MP 937 Numerical simulation of sir bubbler systems [1977, p.765-778] MP 1618 Isva, Greenland: glacier freezing study [1978, p.231-238] Isva, Greenland: glacier freezing study [1978, p.256-264] MP 1174 Entrainment of ice floes into a submerged outlet [1978, p.291-299] MP 1137 Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1166 River ice [1978, p.369-392] River ice [1979, p.38-45] Point source bubbler systems to suppress ice [1979, 12p.] CR 79-13 Modeling of ice in rivers [1979, p.14/1-14/26] MP 1335 Point source bubbler systems to suppress ice [1979, p.93-100] MP 1335 Proceedings of the Specialty Conference on Computer and Physical Modeling in Hydraulic Engineering [1980, p.261-1979, p.261-1979, p.261-1979, p.261-1979, p.261-1979 MP 1321 Freshwater ice growth, motion, and decay [1980, p.261-1979, p.261-1979, p.261-1979, p.261-1979, p.261-1979, p.261-1979, p.261-1979, p.261-1979 Treshwater ice growth, motion, and decay [1980, p.261-1979, p.261-1979] Figure ice [1970, p.261-1979] MP 1321
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08 Examining antarctic soils with a scanning electron microscope [1976, p.249-252] Mrs soil-water analyzer: instrument description and status [1977, p.149-158] MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance [1978, p.149-155] Antarctic soil studies using a scanning electron microscope [1978, p.106-112] MP 1386 Water vapor adsorption by sodium montmorillonite at .5C [1978, p.33-64] Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique [1978, p.11-4] Viking GCMS analysis of water in the Martian regolith [1978, p.33-38] Analysis of water in the Martian regolith [1979, p.33-38] MP 1409 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents [1980, p.139-144] Thaving of frozen clays [1985, p.1-9] MP 1934 Anderson, E.A. Permeability of a melting snow cover [1982, p.904-908] Anderson, E.A. Permeability of a melting snow cover [1982, p.904-908] Anderson, E.L. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosse, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.] CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-05 Preliminary evaluation of new LF rediowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) CR 78-06 Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.139-1417) MP 1225 Blectromagnetic geophysical survey at an interior Alaska permafrost exposure (1979, 7p.) Blectrical ground interior (1979, p.32-37) Blectrical resistivity of frozen ground as some electromagnetic geophysical survey at an interior Alaska permafrost exposure (1979, 7p.) Blectrical of Arctic water supplies with geophysical techniques (1979, 30p.) Delineation and engineering characteristics of permafrost beneath the Besufort Ses (1979, p.93-115) MP 1227 Beffects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) R7-23	tion (1977, 20p.) Ashban, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1002 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floos: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) MP 1012 Isua, Greenland: glacier freezing study (1978, p.236-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) River ice (1978, p.369-392) River ice (1978, p.369-392) River ice (1979, p.38-45) Point source bubbler systems to suppress ice (1979, 12p.) CR 79-12 Turbulent heat transfer in large aspect channels (1979, 5p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1335 Point source bubbler systems to suppress ice (1979, p.93-100) MP 1335 Suppression of river ice by thermal effluents (1979, 230-) CR 79-30 Proceedings of the Specialty Conference on Computer and Physical Modeling in Hydraulic Engineering (1980, 492p.) MP 1329
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 981 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.15-61) Wiking GCMS analysis of water in the Martian regolith (1978, p.55-61) Analysis of water in the Martian regolith (1979, p.33-38) MP 1409 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents (1980, p.139-144) Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) Ambrosen, E.A. Permeability of a melting snow cover (1982, p.904-908) MP 1456 Andsreen, E.A. Permeability of a melting snow cover (1982, p.904-908) MP 1565 Andsreen, E.A. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 2085 Andsreen, E.L. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1340 Estimation of heat and mass fluxes over Arctic leads (1980,	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcome, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VIF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Intersection of a surface wave with a dielectric slab discontinuity (1978, 10p.) Rectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.1399-1417) MP 1162 Review of electrical resistivity of frozen ground and some electromagnetic methods for its measurement (1979, p.32-37) Blectromagnetic geophysical survey at an interior Alaska permafrost exposure (1979, 7p.) SR 79-15 Delineation and engineering characteristics of permafrost exposure (1979, 7p.) Defineation and engineering characteristics of permafrost engenth the Beaufort Sea (1979, p.93-115) MP 1287 Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Low-frequency sufface impedance measurements at some gla-	tion (1977, 20p.) Aabtea, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and sasessment of research needs (1974, p.1-15) River-ice problems: a state-of-the-art survey and sasessment of research needs (1974, p.1-15) River-ice problems: a state-of-the-art survey and sasessment of research needs (1974, p.1-15) RP 1002 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) MP 246 Arching of model ice floses: Effect of mixture variation on two block sizes [1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems [1977, p.765-778] MP 1618 Isua, Greenland: glacier freezing study [1978, p.236-264] MP 1618 Isua, Greenland: glacier freezing study [1978, p.256-264] MP 1174 Entrainment of ice floes into a submerged outlet [1978, p.291-299] Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] River ice [1979, p.38-45] River ice [1979, p.38-45] River ice [1979, p.38-45] River ice [1979, p.38-45] Point source bubbler systems to suppress ice [1979, 12p.] CR 79-12 Turbulent heat transfer in large aspect channels [1979, p.93-100) MP 1335 Point source bubbler systems to suppress ice [1979, p.93-100) Suppression of river ice by thermal effluents [1979, 23p.] CR 79-30 Proceedings of the Specialty Conference on Computer and Physical Modeling in Hydraulic Engineering [1980, p.261-304) MP 1321 Freshwater ice growth, motion, and decay [1980, p.261-304) Bottom heat transfer to water bodies in winter [1981, 8p.]
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 981 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-14) MP 1210 Viking GCMS analysis of water in the Martian regolith (1978, p.53-61) MP 1499 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents (1980, p.139-144) Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1412 Thawing of frozen clays (1985, p.1-9) MP 1412 Thawing of frozen clays (1985, p.1-9) MP 1923 Andersea, E.A. Permeability of a melting snow cover (1982, p.904-908) MP 1565 Andrease, E.L. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1340 Estimation of heat and mass fluxes over Arctic leads (1980,	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcose, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Interaction of an airborne resistivity survey conducted at very low frequency (1977, 48p.) Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz [1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.1399-1417) MP 1166 Review of electrical resistivity of frozen ground and some electromagnetic methods for its measurement (1979, p.32-37) Blectrical ground impedance measurement (1979, p.32-37) Delineation and engineering characteristics of permafrost exposure (1979, 7p.) SR 79-14 Detection of Arctic water supplies with geophysical techniques (1979, 30p.) Beforts of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Low-frequency surface impedance measurements at some glocal areas in the United States (1980, p.1-9) MP 1230	tion (1977, 20p.) Aabtan, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) RIP 1002 Show and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1978, p.231-238) Isva, Greenland: glacier freezing study (1978, p.256-264, MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) River ice (1978, p.369-392) River ice (1979, p.38-45) Point source bubbler systems to suppress ice (1979, 12p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1335 Point source bubbler systems to suppress ice (1979, p.93-100) MP 1335 Point source bubbler systems to suppress ice (1979, p.93-100) MP 1336 Proceedings of the Specialty Conference on Computer and Physical Modeling in Hydraulic Engineering (1980, 492p.) MP 1326 Freahwater ice growth, motion, and decay (1980, p.261-304) River ice growth, motion, and decay (1980, p.261-304) River ice growth, motion, and decay (1981, 8p.) Bottom heat transfer to water bodies in winter (1981, 8p.)
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 981 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.15-61) Analysis of water in the Martian regolith (1979, p.33-38) Analysis of water in the Martian regolith (1979, p.33-38) Analysis of water in the Martian fregolith (1978, p.35-61) Analysis of water contents and high salt contents (1980, p.139-144) Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) AMP 1330 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) AMP 1340 Thawing of frozen clays (1985, p.1-9) MP 1923 Andersea, E.A. Permeability of a melting snow cover (1982, p.904-908) MP 1565 Andersea, E.L. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1748 Estimation of heat and mass fluxes over Arctic leads (1980, p.2057-2063) MP 1740 Estimation of submarine permagnetic with a Lyman-alpha hyprometer (1981, p.467-475) MP 1748	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcome, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground (1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permarrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, p.501-507) Electrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.399-1417) MP 1266 Review of electrical resistivity of frozen ground and some electromagnetic geophysical surveys at an interior Alaska permafrost exposure (1979, 7p.) Belectromagnetic geophysical survey at an interior Alaska permafrost exposure (1979, 7p.) Delineation and engineering characteristics of permafrost exposure (1979, 7p.) Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1979, p.93-115) MP 1280 HP to VHF radio frequency polarization studies in sea ice at Pt. Barrow, Alaska (1980, p.225-245) MP 1324	tion (1977, 20p.) Aabtea, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers [1971, 157p.] River-ice problems: a state-of-the-art survey and assessment of research needs [1974, p.1-15] River-ice problems: a state-of-the-art survey and assessment of research needs [1974, p.1-15] River-ice problems: a state-of-the-art survey and assessment of research needs [1974, p.1-15] River-ice problems: a state-of-the-art survey and assessment of research needs [1975, p.435-441, 475-487] MP 244 Passage of ice at hydraulic structures [1976, p.1726-1736] Arching of model ice floes: Effect of mixture variation on two block sizes [1976, 11p.] CR 76-42 Numerical simulation of sir bubbler systems [1977, p.765-778] NP 1618 Isua, Greenland: glacier freezing study [1978, p.256-264] MP 1618 Isua, Greenland: glacier freezing study [1978, p.256-264] MP 1174 Entrainment of ice floes into a submerged outlet [1978, p.291-299] Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] River ice [1978, p.369-392] River ice [1979, p.38-45] Point source bubbler systems to suppress ice [1979, 12p.] CR 79-13 Modeling of ice in rivers [1979, p.14/1-14/26] MP 1335 Point source bubbler systems to suppress ice [1979, p.93-100, MP 1335 Point source bubbler systems to suppress ice [1979, p.93-100, MP 1335 Proceedings of the Specialty Conference on Computer and Physical Modeling in Hydraulic Engineering [1980, p.261-304] Bottom heat transfer to water bodies in winter [1981, 8p.] SR 81-18 Performance of a point source bubbler under thick ice [1982, p.111-124] Performance of a point source bubbler under thick ice [1982, p.111-124] MP 1328
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08 Examining antarctic soils with a scanning electron microscope [1976, p.249-252] Mrs. MP 931 Mars soil-water analyzer: instrument description and status [1977, p.149-158] MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance [1978, p.149-155] MP 1097 Antarctic soil studies using a scanning electron microscope [1978, p.106-112] MP 1386 Water vapor adsorption by sodium montmorillonite at .5C [1978, p.638-644] Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique [1978, p.11-4] Viking GCMS analysis of water in the Martian regolith [1979, p.33-38] Analysis of water in the Martian regolith [1979, p.33-38] MP 1409 Low temperature phase changes in montmorillonite and non-tronite at high water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Thawing of frozen clays [1985, p.1-9] Andersea, E.A. Permeability of a melting snow cover [1982, p.904-908, p.203-208] Andrese, E.L. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Estimation of heat and mass fluxes over Arctic leads [1980, p.205-208] Andrese, E.L. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1410 Estimation of heat and mass fluxes over Arctic leads with a Lyman-alpha hygrometer [1981, p.467-475, MP 1728 Observations of condensate profiles over Arctic leads with a	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosse, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.] CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-02 Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) CR 78-06 Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.1399-1417) MP 1263 Blectromagnetic geophysical aurvey at an interior Alaska permafrost exposure (1979, 7p.) Blectrical resistivity of frozen ground and some electromagnetic methods for its measurement (1979, p.32-37) Blectromagnetic geophysical aurvey at an interior Alaska permafrost exposure (1979, 7p.) Blectromagnetic geophysical survey at an interior Alaska permafrost exposure (1979, 7p.) Blectromagnetic geophysical of frozen ground conducted in northern Maine (1978, p.1399-1417) MP 1221 Low-frequency surface impedance measurements at some glacial sease in the United States (1980, p.1-9) MP 1280 HF to VHF radio frequency polarization studies in sea ice at Pt. Barrow, Alaska (1980, p.225-245) MP 1324 VHF electrical properties of frozen ground near Point Barrow, VHF electrical properties of frozen	tion (1977, 20p.) Aabten, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1002 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) MP 936 Numerical simulation of sir bubbler systems (1978, p.231-238) Isva, Greenland: glacier freezing study (1978, p.236-264, MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) River ice (1978, p.369-392) River ice (1979, p.38-45) Point source bubbler systems to suppress ice (1979, 12p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1335 Point source bubbler systems to suppress ice (1979, p.93-100) Suppression of river ice by thermal effluents (1979, p.30-100) Proceedings of the Specialty Conference on Computer and Physical Modeling in Hydraulic Engineering (1980, 492p.) MP 1329 Bottom heat transfer to water bodies in winter (1981, 8p.) Freshwater ice growth, motion, and decay (1980, p.261-304) MP 1239 River ice suppression by side channel discharge of warm
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MP 1055 Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables) Prediction of unfrozen water contents in frozen soils from liquid determinations (1976, 9p.) CR 76-08 Examining antarctic soils with a scanning electron microscope (1976, p.249-252) MP 931 Mars soil-water analyzer: instrument description and status (1977, p.149-158) MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance (1978, p.149-155) MP 1396 Antarctic soil studies using a scanning electron microscope (1978, p.106-112) MP 1386 Water vapor adsorption by sodium montmorillonite at .5C (1978, p.638-644) MP 981 Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique (1978, p.11-14) MP 1210 Viking GCMS analysis of water in the Martian regolith (1978, p.53-61) MP 1396 Low temperature phase changes in montmorillonite and nontronite at high water contents and high salt contents (1980, p.139-144) Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1330 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance (1980, p.400-412) MP 1412 Thawing of frozen clays (1985, p.1-9) MP 1923 Andersen, E.A. Permeability of a melting snow cover (1982, p.904-908) MP 1456 Andersen, E.L. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1340 Estimation of heat and mass fluxes over Arctic leads (1980, p.2057-2063) MP 1449 Estimation of condensate profiles over Arctic leads with a Lyman-alpha hygrometer (1981, p.467-475) MP 1728 Observations of condensate profiles over Arctic leads with a Lyman-alpha hygrometer (1981, p.467-475) MP 1728 Observations of condensate profiles over Arctic leads with a Lyman-alpha hygrometer (1981, p.467-475) MP 1728	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcome, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.) CR 77-02 Numerical studies to aid interpretation of an airborne VIE resistivity survey (1977, 10p.) Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency [1977, 48p.) Intersction of a surface wave with a dielectric slab discontinuity (1978, 10p.) Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Rectrical ground impedance measurements in the United States between 200 and 415 kHz [1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine [1978, p.1399-1417) Review of electrical resistivity of frozen ground and some electromagnetic methods for its measurement [1979, p.32-37] Blectromagnetic geophysical survey at an interior Alaska permafrost (1979, 30p.) Definestion and engineering characteristics of permafrost exposure (1979, 7p.) Definestion and engineering characteristics of permafrost beneath the Beaufort Sea [1979, p.93-115, MP 1287 Reflects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) CR 79-15 Delinestion and engineering characteristics of permafrost beneath the Beaufort Sea [1979, p.93-115, MP 1287 Reflects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) CR 79-23 Low-frequency surface impedance measurements at some glacial areas in the United States [1980, p.1-9) MP 1287 MP 1287 Productin	tion (1977, 20p.) Aabtea, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) Snow and ice (1975, p.435-441, 475-487) Passage of ice at hydraulic structures (1976, p.1726-1736) MP 946 Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1977, p.765-778) Numerical simulation of sir bubbler systems (1978, p.231-238) Isua, Greenland: glacier freezing study (1978, p.256-264) MP 1618 Isua, Greenland: glacier freezing study (1978, p.256-264) MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) River ice (1978, p.369-392) River ice (1979, p.38-45) Point source bubbler systems to suppress ice (1979, 12p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1335 Point source bubbler systems to suppress ice (1979, p.93-100) MP 1326 Suppression of river ice by thermal effluents (1979, 23p.) CR 79-30 Proceedings of the Specialty Conference on Computer and Physical Modeling in Hydraulic Engineering (1980, p.261-304) MP 1321 Freshwater ice growth, motion, and decay (1980, p.261-304) RP 1329 RP 1529 RP 1529
Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-21] MP 1055 Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables] Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08 Examining antarctic soils with a scanning electron microscope [1976, p.249-252] Mrs. MP 931 Mars soil-water analyzer: instrument description and status [1977, p.149-158] MP 912 Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance [1978, p.149-155] MP 1097 Antarctic soil studies using a scanning electron microscope [1978, p.106-112] MP 1386 Water vapor adsorption by sodium montmorillonite at .5C [1978, p.638-644] Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique [1978, p.11-4] Viking GCMS analysis of water in the Martian regolith [1979, p.33-38] Analysis of water in the Martian regolith [1979, p.33-38] MP 1409 Low temperature phase changes in montmorillonite and non-tronite at high water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Thawing of frozen clays [1985, p.1-9] Andersea, E.A. Permeability of a melting snow cover [1982, p.904-908, p.203-208] Andrese, E.L. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Estimation of heat and mass fluxes over Arctic leads [1980, p.205-208] Andrese, E.L. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1410 Estimation of heat and mass fluxes over Arctic leads with a Lyman-alpha hygrometer [1981, p.467-475, MP 1728 Observations of condensate profiles over Arctic leads with a	Modelling a snowdrift by means of activated clay particles (1985, p.48-52) Appal, G.C. Analysis of the midwinter temperature regime and snow occurrence in Germany (1978, 56p.) CR 78-21 Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218 Arcosse, S.A. Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37 Computer program to determine the resistance of long wires and rods to nonhomogeneous ground [1977, 16p.] CR 77-02 Numerical studies to aid interpretation of an airborne VLF resistivity survey (1977, 10p.) CR 77-02 Preliminary evaluation of new LF radiowave and magnetic induction resistivity units over permafrost terrain (1977, p.39-42) Investigation of an airborne resistivity survey conducted at very low frequency (1977, 48p.) CR 77-20 Interaction of a surface wave with a dielectric slab discontinuity (1978, 10p.) CR 78-06 Shallow electromagnetic geophysical investigations of permafrost (1978, p.501-507) Blectrical ground impedance measurements in the United States between 200 and 415 kHz (1978, 92p.) MP 1221 Investigation of a VLF airborne resistivity survey conducted in northern Maine (1978, p.1399-1417) MP 1263 Blectromagnetic geophysical aurvey at an interior Alaska permafrost exposure (1979, 7p.) Blectrical resistivity of frozen ground and some electromagnetic methods for its measurement (1979, p.32-37) Blectromagnetic geophysical aurvey at an interior Alaska permafrost exposure (1979, 7p.) Blectromagnetic geophysical survey at an interior Alaska permafrost exposure (1979, 7p.) Blectromagnetic geophysical of frozen ground conducted in northern Maine (1978, p.1399-1417) MP 1221 Low-frequency surface impedance measurements at some glacial sease in the United States (1980, p.1-9) MP 1280 HF to VHF radio frequency polarization studies in sea ice at Pt. Barrow, Alaska (1980, p.225-245) MP 1324 VHF electrical properties of frozen ground near Point Barrow, VHF electrical properties of frozen	tion (1977, 20p.) Aabten, G.D. Temperature and flow conditions during the formation of river ice [1970, 12p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) Formation of ice ripples on the underside of river ice covers (1971, 157p.) River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1002 Snow and ice (1975, p.435-441, 475-487) MP 244 Passage of ice at hydraulic structures (1976, p.1726-1736) Arching of model ice floes: Effect of mixture variation on two block sizes (1976, 11p.) CR 76-42 Numerical simulation of sir bubbler systems (1977, p.765-778) MP 936 Numerical simulation of sir bubbler systems (1978, p.231-238) Isva, Greenland: glacier freezing study (1978, p.236-264, MP 1174 Entrainment of ice floes into a submerged outlet (1978, p.291-299) Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results (1978, p.362-366) River ice (1978, p.369-392) River ice (1979, p.38-45) Point source bubbler systems to suppress ice (1979, 12p.) CR 79-13 Modeling of ice in rivers (1979, p.14/1-14/26) MP 1335 Point source bubbler systems to suppress ice (1979, p.93-100) Suppression of river ice by thermal effluents (1979, p.30-100) Proceedings of the Specialty Conference on Computer and Physical Modeling in Hydraulic Engineering (1980, 492p.) MP 1329 Bottom heat transfer to water bodies in winter (1981, 8p.) Freshwater ice growth, motion, and decay (1980, p.261-304) MP 1239 River ice suppression by side channel discharge of warm

Ashten, G.D. (cost.) Using the DWOPER routing model to simulate river flows	Bastian, R. Wetlands for wastewater treatment in cold climates [1984,	Post occupancy evaluation of a remote Australian commun ty: Shay Gap, Australia [1980, 57p.] SR 86-2
with ice (1983, 19p.) SR 83-01 Predicting lake ice decay (1983, 4p.) SR 83-19	9p. + figs.; MP 1945 Bastles, R.E.	Beltnes, S. Field investigations of a hanging ice dam (1982, p.475-488)
Pirst-generation model of ice deterioration [1983, p.273-278]	Aquaculture systems for wastewater treatment: an engineering assessment [1980, 127p.] MP 1422	MP 153 Ice jams in shallow rivers with floodplain flow: Discussion
Lake ice decay (1983, p.83-86) MP 1684 Deterioration of floating ice covers (1984, p.26-33)	Engineering assessment of equaculture systems for wastewn- ter treatment: an overview [1980, p.1-12] MP 1423	[1984, p.370-371] MP 179 Benter, R.H.
Ice bands in turbulent pipe flow [1984, 7p.] MCP 2007	Meteorological conditions causing major ice jum formation	Ice-cratering experiments Blair Lake, Alaska (1966, Various pagings) MIP 103
loe deterioration (1984, p.31-38) MP 1791	and flooding on the Ottauquechee River, Vermont 1982, 25p. ₁ SE 82-66	Bennett, B.M. Cazenovia Creek Model data acquisition system [1985]
Deterioration of floating ice covers (1985, p.177-182) MP 2122	Meteorological measurements at Camp Bthan Allen Training Center, Vermont (1982, p.77-112) MP 1984	p.1424-1429j MP 209 Bennett, F.L.
Bubblers and pumps for melting ice (1986, p.223-234) MP 2133	Snow cover and meteorology at Allagash, Maine, 1977-1980 [1983, 49p.] SR 83-28	Estimating heating requirements for buildings under construction in cold regions—an interactive computer as
Assur, A. Structures in ice infested water [1972, p.93-97]	Snow-cover characterization: SADARM support 1984, p.409-411 ₁ MP 2895	proach (1977, 113p.) SR 77-0
MP 1016	Betos, R.E.	Temporary protection of wintertime building construction Fairbanks, Alasks, 1976-77 [1977, 41p.] SR 77-3
See ice engineering t1976, p.231-2341 MP 986 Some promising trends in ice mechanics t1980, p.1-151	Menoscale measurement of anow-cover properties (1973, p.624-643) MP 1029	Roof construction under wintertime conditions: a case stud [1978, 34p.] SR 78-2
MP 1300 Soviet construction under difficult climatic conditions	Winter thermal structure and ice conditions on Lake Cham- plain, Vermont [1976, 22p.] CR 76-13	Bentley, C.R.
[1980, p.47-53] MP 1345	Utilization of sewage aladge for terrain stabilization in cold	Reconsideration of the mass balance of a portion of the Ros fice Shelf, Antarctics (1984, p.381-384) MP 191
Tertiary creep model for frozen sands (discussion) [1984, p.1373-1378] MP 1010	regions (1977, 45p.) SR 77-37 Microbiological aerosols from a field source during sprinkler	Beatley, D.L. Fraction touchasts of model ice -1986, p. 365-376.
Surfacing submarines through ice [1984, p.309-318] NCP 1998	irrigation with wastewater [1978, p.273-280] MP 1154	Fracture toughness of model ice (1986, p.365-376)
Atkins, R.T.	Climatic survey at CRREL in association with the land treat-	Berg, R. Mobility of water in frozen soils [1982, c15p.]
Use of instrumentation under Arctic conditions (1972, p.183-188) NIP 990	ment project [1978, 37p.] SR 78-21 Snow cover mapping in northern Maine using LANDSAT	MP 201
Development of a remote-reading tensiometer/transducer	digital processing techniques [1979, p.197-198] MP 1510	Effect of unconfined loading on the unfrozen water conter of Manchester silt (1983, 17p.) SR 83-1
system for use in subfreezing temperatures [1976, p.31-45] MP 897	Documentation of soil characteristics and climatology during	Revised procedure for pavement design under seasonal fro conditions (1983, 129p.) SR 83-2
Stake driving tools: a preliminary survey (1977, 43p.)	five years of wastewater application to CRREL test cells (1979, 32p.) SR 79-23	Survey of airport pavement distress in cold regions [1986,
Determination of frost penetration by soil resistivity measure-	Utilization of sewage studge for terrain stabilization in cold regions, Part 2 [1979, 36p.] SR 79-28	p.41-50 ₁ MP 200 Borg, R.L.
ments [1979, 24p.] SR 79-22 Using electronic measurement equipment in winter [1981,	Becterial aerosols from a field source during multiple-sprin-	Heat and moisture flow in freezing and thawing soils—a fiel
7p. ₁ TD 81-01	kler irrigation: Deer Creek Lake State Park, Ohio 1979, 64p. SE 79-32	study (1975, p.148-160) MP 161 Near real time hydrologic data acquisition utilizing th
Athinson, J. Dynamics of NH4 and NO3 in cropped soils irrigated with	Lake Champlain ice formation and ice free dates and predic-	LANDSAT system [1975, p.200-211] MP 105
wastewater (1980, 20p.) SR 80-27	tions from meteorological indicators [1979, 21p.]	beneath the Beaufort Sea [1976, p.391-408] MP 137
Atlas, R.M. Fate of crude and refined oils in North Slope soils (1978,	Winter thermal structure, ice conditions and climate of Lake Champiain [1980, 26p.] CR 80-82	Thermoinsulating media within embankments on perennial frozen soil (1976, 161p.) SR 76-4
p.339-347 ₁ MP 1196 Introduction to the Workshop on Ecological Effects of Hy-	New 2 and 3 inch diameter CRREL snow samplers (1980, p.199-200) MP 1430	Galerkin finite element analog of frost heave (1976, p.111)
drocarbon Spills in Alaska [1978, p.155-157] MP 1183	Lake Champlain ice formation and ice free dates and predic-	Development of a remote-reading tensiometer/transduc-
Atwood, D.M.	tions from meteorological indicators (1980, p.125-143) MP 1429	system for use in subfreezing temperatures [1976, p.31-45] MP 89
Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1977, 32p.] SR 77-31	Analysis of ice jams and their meteorological indicators for three winters on the Ottauquechee River, Vermont [1981,	Observations along the pipeline haul road between Livengoo and the Yukon River (1976, 73p.) SR 76-1
Effects of low ground pressure vehicle traffic on tundra at	27p. ₁ CR 81-61	Delineation and engineering characteristics of permafro
Lonely, Alaska [1978, 63p.] SR 78-16 Amer, A.H., Jr.	Meteorology [1982, p.43-180] MIP 1560 Snow cover characterization [1982, p.559-577]	beneath the Beaufort Sea [1976, p.53-60] MP 91 Delineation and engineering characteristics of permafro
Propane dispenser for cold fog dissipation system [1973,	MP 1564	beneath the Beaufort Sea [1977, p.234-237] MP 92
38p. ₁ MP 1033 Belley, P.K.	Microbiological serosols from a field-source wastewater irrigation system [1983, p.63-75] MP 1978	Use of a light-colored surface to reduce seasonal thaw pen- tration beneath embankments on permatrost (1977, p.86
Periglacial landforms and processes in the southern Kenai Mountains, Alaska [1985, 60p.] SR 85-63	Northwest enowstorm of 15-16 December 1981 (1983, p.19-34) MP 1755	99; Mathematical model to predict frost heave (1977, p.92-
Ballled, C.R.	SNOW-ONE-B data report [1983, 284p.] SR 83-16	109 ₁ NEP 113
Preliminary evaluation of 88 years rapid infiltration of raw municipal sewage at Calumet, Michigan 1977, p.489-	Site-specific and synoptic meteorology (1983, p.13-80) MP 1845	Improved drainage and frost action criteria for New Jerse pavement design. Phase 2: Frost action (1978, 80p.) 8R 78-6
510 ₁ MP 976 Bend, L.E.	Climate at CRRBL, Hanover, New Hampahire [1984, 78p.] SR 84-24	SR 78-0 Design considerations for airfields in NPRA (1978, p.441)
Potential use of SPOT HRV imagery for analysis of coestal	Explosive obscuration sub-test results at the SNOW-TWO	458 ₃ MP 100
sediment plumes [1984, p.199-204] MP 1744 Bests, A.	field experiment [1984, p.347-354] MP 1872 Overview of meteorological and snow cover characterization	Temperature effects in compacting an asphalt concrete over lay [1978, p.146-158] MP 100
Prediction of unfrozen water contents in frozen soils from	at SNOW-TWO (1984, p.171-191) MP 1868 Batall, G.O.	They penetration and permafrost conditions associated with the Livengood to Prudhoe Bay road, Alaska (1978, p.615)
liquid determinations [1976, 9p.] CR 76-00 Barnes, P.W.	RATE—The influence of grazing on the Arctic tundra ecosys-	621; MP 116 Design of airfield pavements for seasonal frost and permatro
Statistical aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea [1983, 34p. + map] CR 83-21	tems (1976, p.153-160) MP 970 Bener, C.F.	conditions [1978, 18p.] MP 118
Some probabilistic aspects of ice gouging on the Alaskan Shelf	Reverse phase HPLC method for analysis of TNT, RDX, HMX and 2,4-DNT in munitions wastewater [1984, 95p.]	Improved drainage and frost action criteria for New Jerse pavement design. Phase 2 (Data analysis) [1979, 51p.]
of the Beaufort Sea [1984, p.213-236] MP 1838 Berney, R.J.	CR \$4-29	pavement design. Phase 2 (Data analysis) [1979, 51p.] SR 79-1 Mathematical model to correlate frost heave of pavemen
FIRE IN THE NORTHERN ENVIRONMENT-A SYM-	Interlaboratory evaluation of high-performance liquid chromatographic determination of nitroorganics in muni-	with laboratory predictions [1980, 49p.] CR 80-1
POSIUM [1971, 275p.] MP 878 Beron, J.A.	tion plant wastewater [1986, p.176-182] MP 2050 Reversed-phase high-performance liquid chromatographic	One-dimensional frost heave model based upon simultaneous heat and water flux [1980, p.253-262] MIP 133
Optimization model for land treatment planning, design and operation. Part 1. Background and literature review [1983,	determination of nitroorganics in munitions wastewater [1986, p.170-175] MP 2049	Frost heave in an instrumented soil column (1980, p.211- 221) MP 133
35p. ₁ ## 83-06	Benner, H.T.	New Hampshire field studies of membrane encapsulated so
Optimization model for land treatment planning, design and operation. Part 2. Case study (1983, 30p.) SR 83-07	Microbiological serosols from a field source during sprinkler irrigation with wastewater (1978, p.273-280)	layers with additives [1980, 46p.] SR 80-3 Road performance and associated investigations [1980, p.53
Optimization model for land treatment planning, design and operation. Part 3. Model description and user's guide	MP 1154	100 ₁ MP 139
[1983, 38p.] SR 63-66	Becterial aerosols from a field source during multiple-sprin- kler irrigation: Deer Creek Lake State Park, Ohio 1979,	Environmental engineering and ecological baseline investige tions along the Yukon River-Prudhoe Bay Haul Ros
Barrett, S. Window performance in extreme cold (1981, p.396-408)	64p. ₃ SR 79-32 Microbiological acrosols from a field-source wastewater irri-	(1980, 187p.) CR 86-1 Field cooling rates of asphalt concrete overlays at low tempe
MP 1393	gation system (1983, p.65-75) MP 1578	Field cooling rates of asphalt concrete overlays at low temperatures (1980, 11p.)
Window performance in extreme cold [1982, 21p.] CR 82-38	Pive-year performance of CRREL land treatment test cells;	Some approaches to modeling phase change in freezing so [1981, p.137-145] MP 143
Effects of phase III construction of the Chena Flood Control Project on the Tanana River near Fairbanks, Alaska—a	water quality plant yields and nutrient uptake [1978, 24p.] SE 78-26	Simulating frost action by using an instrumented soil column [1981, p.34-42] MP 144
preliminary analysis (1984, 11p. + figs.) MP 1745	Becktel, R.B.	Results from a mathematical model of frost heave [1981, p.2]
Barton, C.C. Measurement of the resistance of imperfectly elastic rock to	Temporary environment. Cold regions habitability [1976, 162p.] SR 76-10	61 Probabilistic-deterministic analysis of one-dimensional is
the propagation of tensile cracks [1985, p.7827-7836]	Post occupancy evaluation of a planned community in Arctic	segregation in a freezing soil column (1981, p.127-140)

Sensitivity of a frost heave model to the method of numerical simulation r1952, p.1-10, MP 1567	Synoptic weather conditions during selected snowfall events	Dynamic in-situ properties test in fine-grained permafrost r1977, p.282-3131 MP 963
Effect of color and texture on the surface temperature of	between December 1981 and February 1982 (1982, p.9-42) MP 1559	1977 CRREL-USGS permafrost program Beaufort Sea, Alas-
asphalt concrete pavements [1983, p.57-61] MP 1652 Pield tests of a frost-heave model [1983, p.409-414]	Meteorology and observed snow crystal types during the SNOW-ONE experiment [1982, p.59-75] MP 1983	ka, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost
MP 1657 Comparison of two-dimensional domain and boundary inte-	Atmospheric conditions and concurrent snow crystal obser- vations during SNOW-ONR-A [1983, p.3-18]	beneath the Beaufort Sea [1977, p.518-521] MP 1201 Densification by freezing and thawing of fine material
gral geothermal models with embankment freeze-thaw field	MP 1754	dredged from waterways (1978, p.622-628) MP 1103
data (1983, p.509-513) MP 1659 Investigation of transient processes in an advancing zone of	Synoptic meteorology during the SNOW-ONE-A Field Ex- periment [1983, 80p.] SR 83-10	Engineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea (1978, p.629-635)
freezing [1983, p.821-825] MP 1663 Two-dimensional model of coupled heat and moisture trans-	Regional and seasonal variations in snow-cover density in the U.S.S.R. (1984, 70p.) CR 84-22	MP 1104 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska
port in frost heaving soils [1984, p.91-98] MP 1678	Prozen precipitation and concurrent weather: a case study for Munchen/Riem, West Germany [1984, 47p.]	(1979, 45p.) CB: 79-07
Survey of methods for classifying frost susceptibility [1984, p.104-141] MP 1707	SR 84-32 Prozen precipitation and concurrently observed meteorologi-	Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16]
Prost action and its control (1984, 145p.) MP 1704 Status of numerical models for heat and mass transfer in frost-	cal conditions [1985, 11p.] MP 2075	MP 1217 Field methods and preliminary results from subsea permafrost
susceptible soils [1984, p.67-71] MP 1851 Two-dimensional model of coupled heat and moisture trans-	Statistical relationships between cold regions surface condi- tions and climatic parameters [1985, p.508-517]	investigations in the Beaufort Sea, Alaska (1979, p.207- 213) MP 1591
port in frost-heaving soils [1984, p.336-343]	MP 1961 Techniques for measurement of snow and ice on freshwater	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea 1979, p.93-1151 MP 1287
MP 1765 Hydraulic properties of selected soils [1985, p.26-35]	[1986, p.174-222] MIP 2000 Billfalk, L.	Block motion from detonations of buried near-surface explo-
MP 1925 Frost heave of full-depth asphalt concrete pavements [1985,	Breakup of solid ice covers due to rapid water level variations	sive arrays [1980, 62p.] CR 80-26 Prediction of explosively driven relative displacements in
p.66-76 ₁ MP 1927	[1982, 17p.] CR 82-03 Bilmes, J.	rocks (1981, 23p. ₁ CR 81-11 Blumthaler, M.
Partial verification of a thaw settlement model [1985, p.18- 25] MP 1924	Analysis of diffusion wave flow routing model with applica- tion to flow in tailwaters [1983, 31p.] CR 83-07	Study of water drainage from columns of snow (1979, 19p.)
Model of 2-dimensional freezing front movement using the complex variable BE method [1985, 9p.] MIP 2077	Modeling rapidly varied flow in tailwaters [1984, p.271-	Bohren, C.
Berger, R.H.	289 ₁ MP 1711 Bishop, R.J.	Polarization of akylight [1984, p.261-265] MP 1794 Behren, C.P.
Snowpack optical properties in the infrared [1979, 16p.] CR 79-11	Progress report on 25 cm radar observations of the 1971 AID- JEX studies (1972, p.1-16) MP 989	Forward-acattering corrected extinction by nonspherical par-
Analysis of vehicle tests and performance predictions [1981, p.51-67] MP 1477	Black, S.	ticles [1984, p.261-271] MP 1870 Forward-scattering corrected extinction by nonspherical par-
Airborne snow and fog distributions [1982, p.217-223] MP 1562	Wetlands for wastewater treatment in cold climates (1984, 9p. + figs.) MP 1945	ticles [1985, p.1023-1029] MP 1958 Bonde, T.J.H.
Snow and fog particle size measurements (1982, p.47-58)	Blackey, E.A. Use of remote sensing to quantify construction material and	Limnological investigations: Lake Koocanusa, Montana. Part 1: Pre-impoundment study, 1967-1972 [1982, 1849.]
MP 1982 Falling snow characteristics and extinction (1983, p.61-69)	to define geologic lineaments, Dickey-Lincoln School Lakes Project, Maine [1978, 9 leaves] MP 1167	SR 62-21
MP 1756 Developing a model for predicting snowpack parameters af-	Materials availability study of the Dickey-Lincoln dam site	Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 (1982,
fecting vehicle mobility [1983, 26p.] CR 83-16	(1980, p.158-170) MP 1316 Blaisdell, G.L.	597p.; SR \$2-23 Bosatta, E.
Snow characterization at SNOW-ONE-B (1983, p.155- 195) MP 1847	Macroscopic view of snow deformation under a vehicle [1981, 20p.] SR \$1-17	Soil microbiology [1981, p.38-44] MIP 1753
Characterization of snow for evaluation of its effect on elec- tromagnetic wave propagation [1983, p.35-42]	Predicting wheeled vehicle motion resistance in shallow snow	Bosworth, H. Mechanical properties of multi-year sea ice. Phase 1: Test
MP 1648 Berggren, P.A.	[1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evalua-	results [1984, 105p.] CR 84-09 Mechanical properties of multi-year sea ice. Testing tech-
User's index to CRREL land treatment computer programs	tion [1982, 7p.] MP 1516 Design and use of the CRREL instrumented vehicle for cold	niques [1984, 39p.] CIR 84-08
and data files [1982, 65p.] SR 82-26 Corps of Engineers land treatment of wastewater research	regions mobility measurements [1982, 11p.] MP 1515 CRREL instrumented vehicle: hardware and software [1983,	Mechanical properties of multi-year sea ice. Phase 2: Test results (1985, 81p.) CR 85-16
program: an annotated bibliography [1983, 82p.] SR 83-09	75p. ₁ SE 83-03	Bosworth, H.W. Studies of high-speed rotor icing under natural conditions
Best, W.C. Design procedures for underground heat sink systems [1979,	Driving traction on ice with all-season and mud-and-snow radial tires. [1983, 22p.] CR 83-27	(1983, p.117-123; MP 1638 Ice accretion under natural and laboratory conditions (1985,
186p. in var. pagns.] S12 79-08	Multivariable regression algorithm [1983, 41p.]	p.225-228 ₁ MP 2009
Bigi, S.R. Comparative field testing of buried utility locators (1984,	Performance based tire specification system for military wheeled vehicles [1985, p.277-280] MP 2101	Botros, M.M. Design procedures for underground heat sink systems 1979,
25p.) MP 1977 Change in orientation of artillery-delivered anti-tank mines in	Proceedings of the ISTVS Workshop on Measurement and	186p. in var. pagns.; SR 79-08 Botz, J.J.
snow 1984, 20p.; CR 84-20 Permafrost, seasonally frozen ground, snow cover and vegeta-	Evaluation of Tire Performance under Winter Conditions, Alta, Utah, 11-14, April 1983 (1985, 177p.)	Construction of an embankment with frozen soil [1980, 105p.]
tion in the USSR [1984, 128p.] SR 84-36	SR 85-15 Field demonstration of traction testing procedures (1985,	Bouzoun, J.R.
Detection of buried utilities. Review of available methods and a comparative field study [1984, 36p.] CR 84-31	p.176 ₁ MP 2046 Need for snow tire characterization and evaluation (1985,	Land treatment of wastewater at West Dover, Vermont [1977, 24p.] SR 77-33
Bilello, M.A. Mesoscale measurement of snow-cover properties [1973,	p.1-2 ₃ MP 2043	Spray application of wastewater effluent in West Dover, Vermont: an initial assessment [1979, 38p.] SR 79-06
p.624-643 ₃ MP 1029	Design and use of the CRREL Instrumented Vehicle for cold regions mobility measurements [1985, p.9-20]	Preezing problems associated with spray irrigation of was-
Environmental analyses in the Kootenai River region, Montana [1976, 53p.] SR 76-13	Winter tire tests: 1980-81 [1985, p.135-151] MP 2045	Land treatment systems and the environment [1979, p.201-
Study of climatic elements occurring concurrently [1976, p.23-30] MP 1613	Blake, B.J. Construction and performance of platinum probes for meas-	225 ₁ MP 1414 Spray application of wastewater effluent in a cold climate:
Kolyma water balance station, Magadan Oblast, northeast U.S.S.R.: United States-Soviet scientific exchange visit	urement of redox potential [1978, 8p.] SR 78-27	performance evaluation of a full-scale plant [1980, p.620- 626] MP 1403
[1977, 66p.] SR 77-15	Evaluation of nitrification inhibitors in cold regions land treatment of wastewater: Part 1. Nitrapyrin (1979, 25p.)	Removal of organics by overland flow [1980, 9p.] MP 1362
Ice decay patterns on a lake, a river and coastal bay in Canada [1977, p.120-127] MP 969	SR 79-18 Blom, B.E.	Aquaculture for wastewater treatment in cold climates
Decay patterns of land-fast sea ice in Canada and Alaska (1977, p.1-10) MP 1161	Effect of sediment organic matter on migration of various chemical constituents during disposal of dredged material	[1981, p.482-492] MP 1394 Preliminary assessment of the nutrient film technique for was-
Subarctic watershed research in the Soviet Union (1978, p.305-313) MP 1273	(1976, 183p. ₁ MP 967	tewater treatment (1982, 15p.) SR 82-04 Pilot-scale evaluation of the nutrient film technique for was-
Analysis of the midwinter temperature regime and snow oc-	Blouin, S.E. Delineation and engineering characteristics of permafront	tewater treatment [1982, 34p.] SR 82-27
currence in Germany [1978, 56p.] CR 78-21 Climatic survey at CRREL in association with the land treat-	beneath the Beaufort Sea [1976, p.391-408] MP 1377 Analysis of explosively generated ground motions using	Case study of land treatment in a cold climate—West Dover, Vermont [1982, 96p.] CR 82-44
ment project [1978, 37p.] SR 78-21 Notes and quotes from snow and ice observers in Alaska	Analysis of explosively generated ground motions using Fourier techniques (1976, 1861.) CR 76-28	Wastewater treatment and reuse process for cold regions (1983, p.547-557) MP 2112
[1979, p.116-118] MP 1631	Operational report: 1976 USACRREL-USGS subsea perma- frost program Beaufort Sea, Alaska [1976, 20p.]	On-site utility services for remote military facilities in the cold regions [1984, 66p.] SR 84-14
Relationships between January temperatures and the winter regime in Germany (1979, p.17-27) MP 1218	Delineation and engineering characteristics of permafrost	Observations during BRIMFROST '83 [1984, 36p.]
Maximum thickness and subsequent decay of lake, river and fast sea ice in Canada and Alaska [1980, 160p.]	beneath the Beaufort Sea [1976, p.53-60] MP 919 Delineation and engineering characteristics of permafrost	SR 84-10 Analysis of infiltration results at a proposed North Carolina
CR 80-06 Winter environmental data survey of the drainage basin of the	beneath the Beaufort Sea [1977, p.234-237] MP 927	wastewater treatment site [1984, 240.] SR 84-11 Water supply and waste disposal on permanent snow fields
upper Susitna River, Alaska (1980, 30p.) SR 89-19	Delineation and engineering characteristics of permafront beneath the Beaufort Sea (1977, p.385-395) MP 1074	(1984, p.401-413) MP 1714
Pothole primer; a public administrator's guide to understand- ing and managing the pothole problem [1981, 24p.]	Freeze-thaw enhancement of the drainage and consolidation of fine-grained dredged material in confined disposal areas	Water supply and waste disposal on permanent snowfields f1985, p.344-350; MP 1792
MP 1416 Synoptic meteorology during the SNOW-ONE field experi-	(1977, 94p.) MP 978 Delineation and engineering characteristics of permafrost	Bowen, S. Proceedings 1972 Tundra Biome symposium [1972, 211p.]
ment (1981, 55p.) SR 81-27	beneath the Beaufort Sea [1977, p.432-440] MP 1077	MP 1374

Bowen, S.L. SNOW-ONE-B data report [1983, 284p.] SR 83-16	Computer simulation of the snowmelt and soil thermal regime at Barrow, Alaska [1975, p.709-715] MIP 857	Second National Chinese Conference on Permafrost, Lanz- hou, China, 12-18 October 1981 [1982, 58p.]
Catalog of amoke/obscurant characterization instruments	Ecological investigations of the tundra biome in the Prudhoe	SR \$2-63
[1984, p.77-82] MP 1865 Bracy, L.R.	Bay Region, Alaska [1975, 215p.] MP 1053 Delineation and engineering characteristics of permafrost	Some recent trends in the physical and chemical characteriza- tion and mapping of tundra soils, Arctic Slope of Alaska
IMPACT OF SPHERES ON ICE. CLOSURE (1972,	beneath the Beaufort Sea (1976, p.391-408) MP 1377	[1982, p.264-280] MP 1552
p.473; MP 988 Brudthster, S.	Climatic and soil temperature observations at Atkasook on the Meade River, Alaska, summer 1975 [1976, 25p.]	Environmental and societal consequences of a possible CO2- induced climate change: Volume 2, Part 3—Influence of
Runoff from a small subarctic watershed, Alaska [1983,	SR 76-01 Arctic transportation: operational and environmental evalua-	short-term climate fluctuations on permafrost terrain [1982, 30p.] MIP 1546
p.115-120; MP 1654 Brodthmer, S.R.	tion of an air cushion vehicle in Northern Alaska [1976,	Landsat-assisted environmental mapping in the Arctic Na-
Drainage network analysis of a subsectic watershed: Caribou-	7p. ₁ NIP 894 RATE—The influence of grazing on the Arctic tundra ecosys-	tional Wildlife Refuge, Alaska (1982, 59p. + 2 maps) CR 82-37
Poker Creeks research watershed, interior Alaska [1979, 9p.] SE 79-19	tems (1976, p.153-160) MIP 970 Ecological and environmental consequences of off-road traf-	Guidebook to permafrost and related features along the Elli- ott and Dalton Highways, Fox to Prudhoe Bay, Alaska
Drainage network analysis of a subarctic watershed [1979, p.349-359] MP 1274	fic in northern regions [1976, p.40-53] MP 1383	[1983, 230p.] MP 1640
Tundra lakes as a source of fresh water: Kipnuk, Alaska	Environmental analyses in the Kootenai River region, Montana [1976, 53p.] SR 76-13	Observations on ice-cored mounds at Sukakpak Mountain, south central Brooks Range, Alaska [1983, p.91-96]
[1979, 16p.] SR 79-30 Brower, M.C.	Delineation and engineering characteristics of permafroat beneath the Beaufort Sea [1976, p.53-60] MP 919	U.S. tundra biome publication list [1983, 29p.]
Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1977, 32p.] SR 77-31	Arctic transportation: operational and environmental evalua-	SR 43-29
Effects of low ground pressure vehicle traffic on tundra at	tion of an air cushion vehicle in northern Alaska [1977, p.176-182] MP 985	Potential responses of permafrost to climatic warming [1984, p.92-105] MP 1710
Lonely, Alaska [1978, 63p.] SR 78-16 Long-term effects of off-road vehicle traffic on tundra terrain	Delineation and engineering characteristics of permafront beneath the Beaufort Sea [1977, p.234-237] MIP 927	Long-term effects of off-road vehicle traffic on tundra terrain [1984, p.283-294] MP 1828
[1984, p.283-294] MIP 1820	Delineation and engineering characteristics of permafrost	Workshop on Permafrost Geophysics, Golden, Colorado, 23-
Breckett, B.E. Environmental analyses in the Kootenai River region, Mon-	beneath the Beaufort Sea (1977, p.385-395) MP 1074 Computer modeling of terrain modifications in the arctic and	24 October 1984 [1985, 113p.] SR 85-85 U.S. permafrost delegation visit to the People's Republic of
tana (1976, 53p.) SR 76-13 Microbiological serosols from a field source during sprinkler	subarctic [1977, p.24-32] MP 971	China, 15-31 July 1984 (1985, 137p.) SR 85-09 Terrain analysis from space shuttle photographs of Tibet
irrigation with wastewater [1978, p.273-280]	Symposium: geography of polar countries; selected papers and summaries [1977, 61p.] SR 77-06	(1986, p.400-409) MIP 2097
MP 1154 Mass water balance during spray irrigation with wastewater at	Revegetation and erosion control observations along the Trans-Alaska Pipeline—1975 summer construction season	Brown, J.M. Rapid detection of water sources in cold regions—a selected
Mass water balance during spray irrigation with westewater at Door Crock Lake land treatment site [1978, 43p.] SR 79-29	[1977, 36p.] SR 77-08	bibliography of potential techniques [1979, 75p.] SR 79-10
Construction and performance of platinum probes for meas-	Effects of low-pressure wheeled vehicles on plant communi- ties and soils at Prudhoe Bay, Alaska [1977, 49p.]	Brown, L.
urement of redox potential [1978, 8p.] SR 78-27 Bacterial acrosols from a field source during multiple-sprin-	SR 77-17 Effects of low ground pressure vehicle traffic on tundra at	Snow accumulation for arctic freshwater supplies [1975, p.218-224] MP 260
kler irrigation: Deer Creek Lake State Park, Ohio 1979, 64p. ₁ SR 79-32	Lonely, Alaska [1977, 32p.] SR 77-31	Upland aspen/birch and black spruce stands and their litter
Drilling and coring of frozen ground in northern Alaska,	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.432-440] MP 1077	and soil properties in interior Alaska [1976, p.33-44] MP 867
Spring 1979 [1980, 14p.] SR 80-12 Infiltration characteristics of soils at Apple Valley, Minn.;	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MIP 1201	Browa, ML. Lake Champlain ice formation and ice free dates and predic-
Clarence Cannon Dam, Mo; and Deer Creek Lake, Ohio, land treatment sites [1980, 41p.] SR 80-36	1977 tundra fire in the Kokolik River area of Alaska [1978,	tions from meteorological indicators [1979, 21p.]
Hydraulic characteristics of the Deer Creek Lake land treat-	p.54-58 ₁ MP 1125 Distribution and properties of road dust and its potential im-	Analysis of ice jams and their meteorological indicators for
ment site during wastewater application [1981, 37p.] CR 81-07	pact on tundra along the northern portion of the Yukon River-Prudhoe Bay Haul Road. Chemical composition of	three winters on the Ottauquechee River, Vermont [1981, 27p.] CR 21-01
Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-30	dust and vegetation [19/8, p.110-111] MLP 1116	Meteorological conditions causing major ice jam formation
Microbiological aerosols from a field-source wastewater irri-	Ecological baseline investigations along the Yukon River- Prudhoe Bay Haul Road, Alaska [1978, 131p.]	and flooding on the Ottauquechee River, Vermont [1982, 25p.] SR 82-06
gation system [1983, p.65-75: MP 1578 Observations on ice-cored mounds at Sukakpak Mountain,	MP 1115 Climatic and dendroclimatic indices in the discontinuous per-	Brown, R.L. Volumetric constitutive law for snow subjected to large strains
south central Brooks Range, Alaska [1983, p.91-96] MP 1653	mafrost zone of the Central Alsakan Uplands [1978, p. 392- 398] MP 1099	
Prototype drill for core sampling fine-grained perennially	Thaw penetration and permafrost conditions associated with	and strain rates [1979, 13p.] CR 79-20 Analysis of plastic shock waves in snow [1979, 14p.] CR 79-29
frozen ground [1985, 29p.] CR 85-01 Sub-ice channels and longitudinal frazil bars, ice-covered	the Livengood to Prudhoe Bay road, Alaska [1978, p.615-621] MP 1102	Volumetric constitutive is * for snow based on a neck growth model [1980, p.161-165] MP 1883
Tanana River, Alaska [1986, p.465-474] MP 2129	1977 tundra fire at Kokolik River, Alaska [1978, 11p.] SR 78-10	Pressure waves in snow [1980, p.99-107] MP 1306
Frazil ice pebbles: frazil ice aggregates in the Tanana River near Fairbanks, Alaska (1986, p.475-483) MP 2130	Ecological baseline investigations along the Yukon River-	Analysis of non-steady plastic shock waves in snow (1980, p.279-287) MP 1354
Brohm, D.R. Application of removal and control methods. Section 1:	Prudhoe Bay haul road, Alaska [1978, 131p.] SR 78-13	Propagation of stress waves in alpine snow [1980, p.235- 243] MiP 1367
Railways; Section 2: Highways; Section 3: Airports [1981,	Introduction to the Workshop on Ecological Effects of Hy- drocarbon Spills in Alaska [1978, p.155-157]	Analysis of vehicle tests and performance predictions [1981,
p.671-706 ₁ MP 1447 Bronson, W.A.	MP 1183	p.51-67 ₁ MP 1477 Application of energetics to vehicle trafficability problems
Spray application of wastewater effluent in a cold climate: performance evaluation of a full-scale plant [1980, p.620-	Effects of crude and diesel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sen-	(1981, p.25-38) MP 1474
626 ₁ MP 1403	sitivity maps [1978, p.242-259] MP 1184 Effects of low ground pressure vehicle traffic on tundra at	Proceedings of a workshop on the properties of snow, 8-10 April 1981, Snowbird, Utah [1982, 135p.] SR 82-18
Energy conservation at the West Dover, Vermont, water pol- lution control facility t1982, 18p.1 SR 82-24	Lonely, Alaska [1978, 63p.] SR 78-16	Comparison of two constitutive theories for compressive deformation of columnar sea ice [1986, p.241-252]
Browa, J. Tundra biome program [1970, p.1278] MP 881	Human-induced thermokarst at old drill sites in northern Alaska [1978, p.16-23] MP 1254	MP 2124 Brown, W.E.
Bibliography of the Barrow, Alaska, IBP ecosystem model	Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska [1978,	Progress report on 25 cm radar observations of the 1971 AID-
[1970, p.65-71] MP 946 Synthesis and modeling of the Barrow, Alaska, ecosystem	81p.; CR 78-28 Physical and thermal disturbance and protection of perma-	JEX studies (1972, p.1-16) MP 989 Brunner, W.
(1970, p.44-49) MP 944	frost [1979, 42p.] SR 79-05	Suppression of ice fog from the Fort Wainwright, Alaska,
Word model of the Barrow ecosystem [1970, p.41-43] MP 943	Landsat digital analysis of the initial recovery of the Kokolik River tundra fire area, Alaska [1979, 15p.] MP 1638	cooling pond [1982, 34p.] SR 82-22 Bryun, K.
Environmental setting, Barrow, Alaska [1970, p.50-64] MP 945	Geobotanical atlas of the Prudhoe Bay region, Alaska [1980, 69p.]	Large-scale ice/ocean model for the marginal ice zone (1984, p.1-7) MIP 1778
Tundra biome applies new look to ecological problems in Alasks [1970, p.9] MP 880	LANDSAT digital analysis of the initial recovery of burned	Ocean circulation: its effect on seasonal sea-ice simulations
Prediction and validation of temperature in tundra soils	tundra at Kokolik River, Alaska (1980, p.263-272) MP 1391	(1984, p.489-492) MP 1700 Bryan, M.L.
[1971, p.193-197] MP 907 Beological effects of oil spills and seepages in cold-dominated	Coastal tundra at Barrow (1980, p.1-29) MP 1356	Imaging radar observations of frozen Arctic lakes [1976, p.169-175] MP 1284
environments (1971, p.61-65) MP 905	Arctic ecosystem: the coastal tundra at Barrow, Alaska [1980, 571p.] MP 1355	Bucher, P.
Abiotic overview [1971, p.173-181] MP 906 U.S. Tundra Biome central program 1971 progress report	Workshop on Environmental Protection of Permafrost Terrain [1980, p.30-36] MP 1314	C-14 and other isotope studies on natural ice (1972, p.D70- D92; MP 1052
(1971, p.244-270) MP 909 Summary of the 1971 US Tundra Biome Program (1972,	Environmental engineering and ecological baseline investiga-	Buck, K.R.
p.306-313 ₁ MIP 995	tions along the Yukon River-Prudhoe Bay Haul Road [1980, 187p.] CR 86-19	Primary productivity in sea ice of the Weddell region [1978, 17p.] CR 78-19
Proceedings 1972 Tundra Biome symposium [1972, 211p.] MP 1374	Road and its environment [1980, p.3-52] MP 1350 Abiotic components; introduction [1981, p.79]	Sea ice and ice algae relationships in the Weddell Sea [1978, p.70-71] MP 1203
Soil properties of the International Tundra Biome sites (1974, p.27-48) MP 1043	MP 1432	Standing crop of algae in the sea ice of the Weddell Sea region
Snow accumulation for arctic freshwater supplies [1975,	Tundra and analogous soils [1981, p.139-179] MP 1405	[1979, p.269-281] MP 1242 Morphology and distribution of the Acanthoecidae (Choano-
p.218-224 ₁ MIP 860 Barrow, Alaska, USA (1975, p.73-124 ₁ MIP 1050	Point Barrow, Alaska, USA _{[1981} , p.775-776] MP 1434	flagellata) from the Weddell Sea during the austral summer, 1977 (1980, 26p.) CR 80-16
Selected climatic and soil thermal characteristics of the Prudhoe Bay region (1975, p.3-12) MP 1054	Surface disturbance and protection during economic develop- ment of the North [1981, 88p.] MP 1467	Sea ice studies in the Weddell Sea aboard USCGC Polar Sea [1980, p.84-96] MP 1431
	((

Study of the Chosnoflagellates (Acanthoecidae) from the	Physical measurements of river ice jams (1978, p.693-695)	Preezing and blocking of water pipes [1982, 11p.]
Weddell Sea, including a description of Diaphanoeca mutiannulata n. sp. [1981, p.47-54] MP 1453	MP 1159 Arching of model ice floes at bridge piers [1978, p.495-507]	Melting ice with air bubblers [1983, 11p.] TD 83-01
Physical mechanism for establishing algal populations in frazil ice (1983, p.363-365) MP 1717	MP 1134 Accelerated ice growth in rivers [1979, 5p.] CR 79-14	Ice-blocked drainage: problems and processes [1983, 9p.] TD 83-02
Buckslew, T.D. Use of the Landsat data collection system and imagery in	Measurement of the shear stress on the underside of simulated ice covers [1980, 11p.] CR 80-24	Solving problems of ice-blocked drainage (1984, 9p.) TD 84-02
reservoir management and operation (1977, c150p.) MP 1114	Analysis of velocity profiles under ice in shallow streams	Carpenter, T.
Bunnell, F.L.	Port Huron ice control model studies [1982, p.361-373]	Multivariable regression algorithm [1983, 41p.] SR 83-32
Arctic ecosystem: the coastal tundra at Barrow, Alaska	MP 1530 Model study of Port Huron ice control structure; wind stress	Carsey, F. Science program for an imaging radar receiving station in
[1980, 571p.] MP 1355 Burch, W.B.	simulation [1982, 27p.] CR 82-09 Resistance coefficients from velocity profiles in ice-covered	Alaska (1983, 45p.) MP 1884 Carsey, F.D.
System for mounting end caps on ice specimens [1985, p.362-365] MP 2016	shallow streams [1982, p.236-247] MP 1540 Ottauquechee River—analysis of freeze-up processes [1982,	Carsey, F.D. Remote sensing of the Arctic seas [1986, p.59-64] MP 2117
Burdick, J. Proceedings of the Second International Symposium on Cold	p.2-37 ₁ MP 1738 Application of HEC-2 for ice-covered waterways (1982,	Curstens, T. Working group on ice forces on structures [1980, 146p.]
Regions Engineering (1977, 597p.) MP 952 Yukon River breakup 1976 (1977, p.592-596) MP 960	p.241-248 ₁ MP 1575 Hydraulic model study of Port Huron ice control structure	SR 80-26
loe force measurement on the Yukon River bridge (1981, p.749-777) MP 1396	(1982, 59p.) CR 82-34 Modeling of ice discharge in river models (1983, p.285-290)	Cass, J.R., Jr. Subsurface explorations in permafrost areas [1959, p.31-41]
Burgi, P.H.	MP 2081 Ice jams in shallow rivers with floodplain flow [1983, p.538-	Cassell, E.A.
River-ice problems: a state-of-the-art survey and assessment of research needs [1974, p.1-15] MP 1002	548 ₁ MP 1644	Spray application of wastewater effluent in West Dover, Vermont: an initial assessment [1979, 38p.] SR 79-06
Burns, B.A. 100 MHz dielectric constant measurements of snow cover:	Ice-related flood frequency analysis: application of analytical estimates [1984, p.85-101] MP 1712	Spray application of wastewater effluent in a cold climate: performance evaluation of a full-scale plant (1980, p.620-
dependence on environmental and snow pack parameters [1985, p.829-834] MP 1913	Ice cover melting in a shallow river [1984, p.255-265] MP 1763	626 ₁ MP 1403 Case study of land treatment in a cold climate—West Dover,
Burns, C.D. Design considerations for airfields in NPRA [1978, p.441-	Cold facts of ice jams: case studies of mitigation methods [1984, p.39-47] MP 1793	Vermont [1982, 96p.] CR 82-44 Caswell, D.M.
458 ₁ MP 1086 Burrous, C.M.	Salmon River ice jams [1984, p.529-533] MP 1796 Numerical simulation of freeze-up on the Ottauquechee River	Hydraulic characteristics of the Deer Creek Lake land treat- ment site during wastewater application [1981, 37p.]
Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance [1978, p.149-155]	(1984, p.247-277) MP 1815 Survey of ice problem areas in navigable waterways (1985,	CR 81-07 Catalog of Saow Research Projects
MP 1097 Phase composition measurements on soils at very high water	32p.) SR 85-62 Ice ism flood prevention measures: Lamoille River at Hard-	Catalog of Snow Research Projects [1975, 103p.] MP 1129
contents by pulsed nuclear magnetic resonance technique [1978, p.11-14] MP 1210	wick, Vermont, USA (1985, p.149-168; MP 1940 Hydrologic aspects of ice jams (1986, p.603-609)	Chacho, E.F.
Bush, M.A.	MP 2116	Runoff from a small subarctic watershed, Alaska (1983, p.115-120) MP 1654
Detecting structural heat losses with mobile infrared thermog- raphy. Part 4: Estimating quantitative heat loss at Dart-	On-site utility services for remote military facilities in the cold	Overview of Tanana River monitoring and research studies near Fairbanks, Alaska (1984, 98p. + 5 appends.)
mouth College, Hanover, New Hampshire [1976, 9p.] CR 76-33	regions [1984, 66p.] SR 84-14 Campbell, W.J.	SR 84-37 Effects of phase III construction of the Chena Flood Control
Bush, R.M. Limnological investigations: Lake Koocanusa, Montana.	Towing icebergs [1974, p.2] MP 1020 Results of the US contribution to the Joint US/USSR Bering	Project on the Tanana River near Fairbanks, Alaska—a preliminary analysis [1984, 11p. + figs.] MP 1745
Part 1: Pre-impoundment study, 1967-1972 [1982, 184p.] SR 82-21	Sea Experiment [1974, 197p.] MP 1032 Meso-scale strain measurements on the Beaufourt sea pack	Sub-ice channels and longitudinal frazil bars, ice-covered Tanana River, Alaska [1986, p.465-474] MP 2129
Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982,	ice (AIDJEX 1971) [1974, p.119-138] MP 1035 Remote sensing program required for the AIDJEX model	Frazil ice pebbles: frazil ice aggregates in the Tanana River near Fairbanks, Alaska [1986, p.475-483] MP 2130
597p. ₁ SR 82-23 Basinger, J.A.	[1974, p.22-44] MP 1940 Ice dynamics in the Canadian Archipelago and adjacent Arc-	Chalich, P.C.
Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340	tic basin as determined by ERTS-1 observations (1975, p.853-877) MP 1585	Sublimation and its control in the CRREL permafrost tunnel [1981, 12p.] SR 81-08
Busks, J. Waste heat utilization through soil heating [1980, p.105-	Remote sensing plan for the AIDJEX main experiment [1975, p.21-48] MP 862	Chamberlain, E.J. Delineation and engineering characteristics of permafrost
120 ₁ MP 1363 Window performance in extreme cold [1981, p.396-408 ₁	Interesting features of radar imagery of ice-covered North	beneath the Beaufort Sea [1976, p.391-408] MP 1377 Operational report: 1976 USACRREL-USGS subsea perma-
MP 1393 Window performance in extreme coid [1982, 21p.]	Visual observations of floating ice from Skylab (1977, p.353-	frost program Beaufort Sea, Alaska [1976, 20p.] SR 76-12
CR 82-38 Buska, J.S.	1793 MP 1263 Integrated approach to the remote sensing of floating ice	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1976, p.53-60] MP 919
Overview of Tanana River monitoring and research studies	[1977, p.445-487] MP 1069 Measurement of mesoscale deformation of Beaufort sea ice	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.234-237] MP 927
near Fairbanks, Alaska (1984, 98p. + 5 appenda.) SR 84-37	(AIDJEX-1971) [1978, p.148-172] MP 1179 Continuum sea ice model for a global climate model [1980,	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.385-395] MP 1074
Effects of phase III construction of the Chena Flood Control Project on the Tanana River near Fairbanks, Alaska—a	p.187-196 ₁ MP 1622 MIZEX—a program for mesoscale air-ice-ocean interaction;	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.432-440] MP 1077
preliminary analysis (1984, 11p. + figs.) MP 1745 Butler, P.L.	experiments in Arctic marginal ice zones. 1. Research strategy [1981, 20p.] SK 81-19	Preeze-thaw enhancement of the drainage and consolidation of fine-grained dredged material in confined disposal areas
Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] SR 81-12	MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 2. A science	[1977, 94p.] MP 978 Resilient modulus and Poisson's ratio for frozen and thawed
Development of a rational design procedure for overland flow systems [1982, 29p.] CR 82-02	plan for a summer Marginal Ice Zone Experiment in the Fram Strait/Greenland Sea: 1984 [1983, 47p.]	silt and clay subgrade materials (1977, p.229-281) MP 1724
Pilot-scale evaluation of the nutrient film technique for was- tewater treatment [1982, 34p.] SR 82-27	SR 83-12 Marginal ice zones: a description of air-ice-ocean interactive	1977 CRREL-USGS permafrost program Beaufort Sea, Alas- ka, operational report (1977, 19p.) SR 77-41
Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-30	processes, models and planned experiments (1984, p.133- 146) MP 1673	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1201
Buzzell, T.D. Land treatment of wastewaters [1974, p.12-13]	Carboe, D.L. Strength of frozen silt as a function of ice content and dry unit	Riffect of freeze-thaw cycles on resilient properties of fine- grained soils [1978, 19p.] MP 1082
MP 1036 Research activities of U.S. Army Cold Regions Research and	weight [1980, p.109-119] MP 1451 Thermal diffusivity of frozen soil [1980, 30p.]	Effect of freezing and thawing on the permeability and struc- ture of soils [1978, p.31-44] MP 1080
Engineering Laboratory [1975, p.9-12] MP 1244 Land treatment of wastewaters for rural communities [1975,	SR 80-38 CRREL frost heave test, USA [1981, p.55-62]	
p.23-39) Calkina, D.J.	MP 1499 Creep behavior of frozen silt under constant uniaxial stress	Engineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea (1978, p.629-635) MP 1104
Investigation of water jets for lock wall deicing [1976,	[1983, p.1507-1512] MP 1805 Creep behavior of frozen silt under constant uniaxial stress	Densification by freezing and thawing of fine material dredged from waterways [1978, p.622-628] MP 1103
p.G2/13-22 ₁ MP 865 Passage of ice at hydraulic structures (1976, p.1726-1736)	(1984, p.33-48) MP 1807	Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt pavement (1978, p.662-
MP 966 Evaluation and recommendations for snowdrift control at	Uniaxial compressive strength of frozen silt under constant deformation rates [1984, p.3-15] MP 1773	6683 MP 1106 Influence of freezing and thawing on the resilient properties
FAA ILS facilities, Barrow and Deadhorse, Alaska, final report (1976, 41p.) MP 914	Strain rate effect on the tensile strength of frozen silt [1985, p.153-157] MP 1898	of a silt soil beneath an asphalt concrete pavement [1978, 59p.] CR 78-23
Analysis of potential ice jam sites on the Connecticut River at Windsor, Vermont (1976, 31p.) CR 76-31	Tensile strength of frozen silt [1986, p.15-28] MP 1971 Carey, E.L.	Overconsolidated sediments in the Beaufort Sea (1978, p.24- 29) MP 1255
Arching of model ice floes: Effect of mixture variation on two block sizes [1976, 11p.] CR 76-42	Solving problems of ice-blocked drainage facilities [1977, 17p.] SR 77-25	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1978, p.50-74) MP 1206
Lock wall deteing with high velocity water jet at Soo Locks, Mi (1977, p.23-35) MP 973	Ice blockage of water intakes [1979, 27p.] MP 1197	Resilient response of two frozen and thawed soils [1979, p.257-271] MP 1176
Prazil ice formation in turbulent flow (1978, p.219-234) MP 1135	Estimating costs of ice damage to private shoreline structures on Great Lakes connecting channels [1980, 33p.] SR 80-22	Penetration tests in subsea permafrost, Prudhoe Bay, Alaska [1979, 45p.] CR 79-07

Chamberlain, E.J. (cont.)	Physical, chemical and biological properties of winter sea ice	Simulation of the enrichment of atmospheric pollutants in
Effect of freeze-thaw cycles on resilient properties of fine- grained soils [1979, p.247-276] MP 1226	in the Weddell Sea [1982, p.107-109] MP 1609 Elemental compositions and concentrations of micros-	snow cover runoff [1981, p.1383-1388] MP 1487 Configuration of ice in frozen media [1982, p.116-123]
Effect of freezing and thawing on the permeability and struc-	pherules in snow and pack ice from the Weddell Sea [1983, p.128-131] MP 1777	MP 1512
ture of soil [1979, p.73-92] MP 1225 Permafrost beneath the Beaufort Sea, near Prudhoe Bay,	Relative abundance of diatoms in Weddell Sea pack ice	Overview of seasonal snow metamorphism [1982, p.45-61] MP 1500
Alaska [1979, p.1481-1493] MP 1211	[1983, p.181-182] MP 1786 Merphology and ecology of diatoms in sea ice from the Wed-	Geometry and permittivity of snow at high frequencies [1982, p.4495-4500] MP 1545
Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska (1979, p.3-16)	deli Sea [1984, 41p.] CR 84-05	Geometry and permittivity of snow [1982, p.113-131]
MP 1217 Field methods and preliminary results from subsea permafrost	Sea ice structure and biological activity in the antarctic marginal ice zone (1984, p.2087-2095) MP 1701	MP 1985 Proceedings of a workshop on the properties of snow, 8-10
investigations in the Beaufort Sea, Alaska [1979, p.207-	Clausen, H.B.	April 1981, Snowbird, Utah [1982, 135p.] SR \$2-18
213 ₁ MP 1591 Delineation and engineering characteristics of permafrost	Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22]	Permeability of a melting anow cover [1982, p.904-908] MP 1565
beneath the Beaufort Sea [1979, p.93-115] MP 1287	MP 998	Growth of faceted crystals in a snow cover [1982, 19p.]
Buried valleys as a possible determinant of the distribution of deeply buried permafrost on the continental shelf of the	Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] MP 997	Proceedings [1983, 314p.] CR 82-29 Proceedings [1983, 314p.] MP 2054
Beaufort Sea [1979, p.135-141] MP 1288	C-14 and other isotope studies on natural ice [1972, p.D70-	lce crystal morphology and growth rates at low supersatura-
Permafrost beneath the Beaufort Sea: near Prudhoe Bay, Alaska (1980, p.35-48) MP 1346	D92 ₁ MP 1052 Stable isotope profile through the Ross Ice Shelf at Little	tions and high temperatures [1983, p.2677-2682] MP 1537
Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1980, p.103-110) MP 1344	America V, Antarctica [1977, p.322-325] MP 1095 Clay, C.S.	Theory of metamorphism of dry snow [1983, p.5475-5482] MP 1603
Overconsolidation effects of ground freezing [1980, p.325-	Discrete reflections from thin layers of snow and ice [1984,	Mechanisms for ice bonding in wet snow accretions on power
337 ₁ MP 1452 Delineation and engineering characteristics of permafrost	p.323-331 ₁ MP 1871 Clohan, G.M.	lines (1983, p.25-30) MP 1633 Snow particle morphology in the seasonal snow cover (1983,
beneath the Beaufort Sea (1981, p.125-157) MP 1428	Computer simulation of urban snow removal [1979, p.293-	p.602-609 ₁ MP 1688
Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1981, p.137-156] MP 1600	302 ₁ MP 1238 Cohen, S.	Comments on the metamorphism of snow [1983, p.149- 151] MP 1650
Statistical evaluation of soil and climatic parameters affecting	Application of removal and control methods. Section 1:	Increased heat flow due to snow compaction: the simplistic
the change in pavement deflection during thawing of sub- grades [1981, 10p.] CR 81-15	Railways; Section 2: Highways; Section 3: Airports [1981, p.671-706] MP 1447	approach [1983, p.227-229] MIP 1693 Comments on "Theory of metamorphism of dry snow" by
Comparative evaluation of frost-susceptibility tests [1981, p.42-52] MP 1486	Colbeck, S.C.	S.C. Colbeck [1984, p.4963-4965] MP 1800
Foundations of structures in polar waters [1981, 16p.]	Small-scale strain measurements on a glacier surface [1971, p.237-243] MIP 993	New classification system for the seasonal snow cover [1984, p.179-181] MP 1921
SR 81-25 Site investigations and submarine soil mechanics in polar re-	Water percolation through homogeneous snow [1973, p.242- 257] MP 1025	Technique for observing freezing fronts (1985, p.13-20)
gions [1981, 18p.] SR 81-24	Snow and ice [1975, p.435-441, 475-487] MP 844	MP 1861 Thermal convection in snow [1985, 61p.] CR 85-09
CRREL frost heave test, USA [1981, p.55-62] MP 1499	Effects of radiation penetration on anowmelt runoff hydrographs [1976, p.73-82] MP 948	Experiments on thermal convection in snow [1985, p.43-47] MP 2006
Frost susceptibility of soil; review of index tests [1981,	Water flow through veins in ice [1976, 5p.] CR 76-06	47 ₁ MP 2006 Temperature dependence of the equilibrium form of ice
110p. ₁ M 81-02 Frost susceptibility of soil; review of index tests [1982,	Effects of radiation penetration on anownelt runoff hydrographs [1976, 9p.] CR 76-11	[1985, p.726-732] MP 1939
110p. ₁ MP 1557	On the use of tensiometers in snow hydrology [1976, p.135-	Theory of natural convection in snow [1985, p.10,641-10,-649] MP 1957
Frost heave of saline soils [1983, p.121-126] MP 1655 Survey of methods for classifying frost susceptibility [1984,	140 ₁ MP 843 Analysis of water flow in dry snow [1976, p.523-527 ₁	What becomes of a winter snowflake [1985, p.312-215] MP 2060
p.104-141 ₃ MP 1707	MP 871	Statistics of coarsening in water-saturated snow [1986,
Shear strength in the zone of freezing in saline soils [1985, p.566-574] MP 1879	Energy balance and runoff from a subarctic snowpack [1976, 29p.] CR 76-27	p.347-352; MP 2015 Frazil ice measurements in CRREL's flume facility (1986,
Automated soils freezing test (1985, 5p.) MP 1892	Generation of runoff from subarctic snowpacks [1976,	p.427-438 ₁ MP 2127
Shear strength anisotropy in frozen saline and freshwater soils (1985, p.189-194) MP 1931	P.677-685; MP 883 Thermodynamic deformation of wet snow [1976, 9p.]	Cole, D.M. Resilient modulus and Poisson's ratio for frozen and thawed
Geotechnical properties and freeze/thaw consolidation behavior of sediment from the Beaufort Sea, Alaska [1985,	Roof loads resulting from rain-on-snow [1977, 19p.]	silt and clay subgrade materials [1977, p.229-281] MP 1724
83p. _J MP 2025	CR 77-12	Effect of freeze-thaw cycles on resilient properties of fine-
Repeated load triaxial testing of frozen and thawed soils [1985, p.166-170] MP 2068	Computer routing of unsaturated flow through snow [1977, 44p.] SR 77-10	grained soils [1978, 19p.] MP 1082 Influence of freezing and thawing on the resilient properties
Ion and moisture migration and frost heave in freezing Morin	Tracer movement through snow [1977, p.255-262]	of a silt soil beneath an asphalt pavement [1978, p.662-
clay [1986, p.1014] MP 1970 Chang, T.C.	MP 1093 Short-term forecasting of water run-off from snow and ice	668 ₁ MP 1106 Technique for measuring radial deformation during repeated
Results of the US contribution to the Joint US/USSR Bering	[1977, p.571-588] MP 1067	load triaxial testing [1978, p.426-429] MP 1157
Sea Experiment [1974, 197p.] MP 1032 Chaplin, M.	Roof loads resulting from rain on snow; results of a physical model [1977, p.482-490] MP 982	Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978,
Investigation of the acoustic emission and deformation response of finite ice plates [1981, 19p.] CR 81-06	Compression of wet snow [1978, 17p.] CR 78-10	59p. ₁ CR 78-23 Resilient response of two frozen and thawed soils [1979,
Chen, R.L.	Difficulties of measuring the water saturation and porosity of snow [1978, p.189-201] MP 1124	p.257-271 ₁ MP 1176
Nitrogen transformations in a simulated overland flow was- tewater treatment system [1980, 33p.] SR 80-16	Regelation and the deformation of wet snow [1978, p.639-650] MP 1172	Effect of freeze-thaw cycles on resilient properties of fine- grained soils [1979, p.247-276] MP 1226
Cheng, S.T.	Physical aspects of water flow through snow [1978, p.165-	Bullet penetration in snow [1979, 23p.] SR 79-25
Compressive and shear strengths of fragmented ice covers— a laboratory study [1977, 82p.] MP 951	206 ₁ MP 1566 Creep rupture at depth in a cold ice sheet (1978, p.733 ₁	Preparation of polycrystalline ice specimens for laboratory experiments [1979, p.153-159] MP 1327
Childers, J.M.	MP 1168	Cyclic loading and fatigue in ice [1981, p.41-53]
River-ice problems: a state-of-the-art survey and assessment of research needs (1974, p.1-15) MP 1002	Proceedings of a Meeting on Modeling of Snow Cover Run- off, 26-28 September 1978, Hanover, New Hampshire	MP 1371 Effect of freezing and thawing on resilient modulus of a granu-
Christensen, F.T.	[1979, 432p.] SR 79-36	iar soil exhibiting nonlinear behavior [1981, p.19-26] MP 1484
Review of experimental studies of uplifting forces exerted by adfrozen ice on marina piles [1985, p.529-542]	Compaction of wet snow on highways [1979, p.14-17] MP 1234	Acoustic emissions from polycrystalline ice [1982, p.183-
MP 1905	Sintering and compaction of snow containing liquid water [1979, p.13-32] MP 1190	199 ₁ MP 1524 Deformation and failure of ice under constant stress or con-
Christopher, W.G. Ice-cratering experiments Blair Lake, Alaska [1966, Various	Estimated snow, ice, and rain load prior to the collapse of the	stant strain-rate [1982, p.201-219] MP 1525
pagings; MP 1034	Hartford Civic Center arena roof [1979, 32p.] SR 79-09	Acoustic emissions from polycrystalline ice [1982, 15p.] CR 82-21
Chung, J.S. Proceedings (1983, 813p.) MP 1581	Snow accumulation, distribution, melt, and runoff (1979, p.465-468) MP 1233	Effect of stress application rate on the creep behavior of poly-
Proceedings [1985, 2 vols.] MP 2105	Water flow through heterogeneous snow [1979, p.37-45]	crystalline ice [1983, p.614-621] MP 1582 Stress/strain/time relations for ice under uniaxial compres-
Proceedings (1986, 4 vols.) MP 2031 Church, R.E.	MP 1219 Focus on U.S. snow research [1979, p.41-52] MP 1261	sion (1983, p.207-230) MP 1587
ORIGIN AND PALEOCLIMATIC SIGNIFICANCE OF	Snow and the organization of snow research in the United	Relationship between creep and strength behavior of ice at failure [1983, p.189-197] MP 1681
LARGE-SCALE PATTERNED GROUND IN THE DONNELLY DOME AREA, ALASKA (1969, 87p.)	States (1979, p.35-58) MP 1262 Grain clusters in wet snow (1979, p.371-384) MP 1267	Effect of stress application rate on the creep behavior of poly- crystalline ice [1983, p.454-459] MP 1671
MP 1180	Margin of the Greenland ice sheet at Isua [1979, p.155-165]	Influence of grain size on the ductility of ice [1984, p.150-
Clapp, C.E. Uptake of nutrients by plants irrigated with municipal was-	MP 1281 Thermodynamics of snow metamorphism due to variations in	157 ₁ MP 1686 Modeling the resilient behavior of frozen soils using unfrozen
tewater effluent (1978, p.395-404) MP 1151 Engineering aspects of an experimental system for land reno-	curvature [1980, p.291-301] MP 1368	water content (1984, p.823-834) MP 1715
vation of secondary effluent [1978, 26p.] SR 78-23	Dynamics of snow and ice masses [1980, 468p.] MP 1297	Grain growth and the creep behavior of ice [1985, p.187- 189] MP 1862
Clark, E.F. Survey of road construction and maintenance problems in	Liquid distribution and the diefectric constant of wet snow (1980, p.21-39) MP 1349	Grain size and the compressive strength of ice (1985, p.220-
central Alaska 1976, 36p.1 SR 76-08	(+200, p.41-32) MIP 1349	226 ₁ MP 1858
	Introduction to the basic thermodynamics of cold capillary	System for mounting end caps on ice specimens (1985,
Charke, D.B. Observations of pack ice properties in the Weddell Sea	Introduction to the basic thermodynamics of cold capillary systems [1981, 9p.] SR 81-06 Simulation of the enrichment of atmospheric pollutants in	System for mounting end caps on ice specimens (1985, p.362-365) MP 2016 Grain size and the compressive strength of ice (1985, p.369-

Repeated load triaxial testing of frozen and thawed soils [1985, p.166-170] MP 2666 Calling, C.M.	Snow in the construction of ice bridges [1985, 12p.] SR 85-18 Courts, H.J.	Interhemispheric comparison of changes in the composition of atmospheric precipitation during the Late Cenozoic era [1977, p.617-631] MP 1679
Pate and effects of crude oil spilled on permafrost terrain.	Winter air pollution at Fairbanks, Alaska (1981, p.512-528) MP 1395	Blank corrections for ultratrace atomic absorption analysis [1979, 5p.] CR 79-03
First year progress report [1976, 18p.] SR 76-15 les breakup on the Chena River 1975 and 1976 [1977, 44p.] CR 77-14	Automotive cold-start carbon monoxide emissions and pre- heater evaluation [1981, 37p.] SR 81-32	Increased mercury contamination of distilled and natural water samples caused by oxidizing preservatives (1979,
Investigation of slumping failure in an earth dam abutment at Kotzebue, Alaska [1977, 21p.] SR 77-21	Least life-cycle costs for insulation in Alaska [1982, 47p.] CR 82-27	p.313-319; MP 1276 Brine zone in the McMurdo Ice Shelf, Antarctica [1982,
Pate and effects of crude oil spilled on permafrost terrain. Second annual progress report, June 1976 to July 1977	Low temperature automotive emissions [1983, 2 vols.] MP 1703	p.166-171; MP 1350 Chemical obscurant tests during winter; environmental fate
(1977, 46p.) SR 77-44 Presh water supply for a village surrounded by salt water—	Coz, G.F.N.	[1982, 9p.] SR 82-19 Baseline water quality measurements at six Corps of Engi-
Point Hope, Alaska [1978, 18p.] SR 78-07	Salinity variations in sea ice [1974, p.109-122] MP 1023	neers reservoirs, Summer 1981 (1982, 55p.) SR 82-30
Effects of winter military operations on cold regions terrain [1978, 34p.] SR 78-17	Summer conditions in the Prudhoe Bay area, 1953-75 [1981, p.799-808] MP 1457	Brine zone in the McMurdo Ice Shelf, Antarctics 1982, 28p. ₁ CR 82-39
Physical, chemical and biological effects of crude oil spills on black spruce forest, interior Alaska [1978, p.305-323]	Equations for determining the gas and brine volumes in sea ice samples [1982, 11p.] CR 82-30	Soft drink bubbles [1983, p.71] MP 1736 Chemical obscurant tests during winter: Environmental fate
MP 1185 Ice fog suppression using reinforced thin chemical films	Bering Strait ses ice and the Pairway Rock icefoot (1982, 40p.) CR 82-31	[1983, p.267-272] MP 1760 Chemical fractionation of brine in the McMurdo Ice Shelf,
[1978, 23p.] CR 78-26 Ice fog suppression using thin chemical films [1979, 44p.]	Equations for determining the gas and brine volumes in sea- ice samples (1983, p.306-316) MP 2055	Antarctica [1983, 16p.] CR 83-06 Baseline acidity of ancient precipitation from the South Pole
MP 1192 Case study: fresh water supply for Point Hope, Alaska (1979,	Thermal expansion of saline ice [1983, p.425-432] MP 1768	[1984, 7p.] CR 84-15 Field sampling of snow for chemical obscurants at SNOW-
p.1029-1040 ₁ MP 1222 Pate and effects of crude oil spilled on subarctic permafrost	Stress measurements in ice (1983, 31p.) CR 83-23	TWO/Smoke Week VI [1984, p.265-270] MIP 2096
terrain in interior Alaska [1980, 128p.] MP 1310 Snow pads used for pipeline construction in Alaska, 1976:	Ricctromagnetic properties of sea ice (1984, 32p.) CR 84-02	Impact of dredging on water quality at Kewaunee Harbor, Wisconain [1984, 16p.] CR 84-21
construction, use and breakup [1980, 28p.] CR 80-17	Preliminary examination of the effect of structure on the com- pressive strength of ice samples from multi-year pressure	Snow chemistry of obscurants released during SNOW- TWO/Smoke Week VI [1984, p.409-416] MIP 1873
Pate and effects of crude oil spilled on subarctic permafrost terrain in interior Alaska [1980, 67p.] CR 80-29	ridges [1984, p.140-144] MP 1685 Summary of the strength and modulus of ice samples from	Sample digestion and drying techniques for optimal recovery of mercury from soils and sediments [1985, 16p.]
Sediment load and channel characteristics in subarctic upland catchments [1981, p.39-48] MP 1518	multi-year pressure ridges [1984, p.126-133] MP 1679	SR 85-16 TNT, RDX and HMX explosives in soils and sediments.
Long-term active layer effects of crude oil spilled in interior Alaska (1983, p.175-179) MP 1656	Mechanical properties of multi-year sea ice. Testing techniques [1984, 39p.] CR 84-08	Analysis techniques and drying losses [1985, 11p.] CR 85-15
Erosion analysis of the north bank of the Tanana River, first deferred construction area [1984, 8p. + figs.]	Mechanical properties of multi-year sea ice. Phase 1: Test results [1984, 105p.] CR 84-09	Craig, J.L. Observations during BRIMFROST '82 [1984, 36p.]
MP 1748 Overview of Tanana River monitoring and research studies	Electromagnetic properties of sea ice [1984, p.53-75] MP 1776	SR 84-10 Crites, R.W.
near Pairbanks, Alaska [1984, 98p. + 5 appends.] SR 84-37	Mechanical properties of sea ice: a status report [1984,	Land treatment: present status, future prospects (1978, p.98- 102) MP 1417
Effects of phase III construction of the Chena Flood Control Project on the Tanana River near Fairbanks, Alaska—a	p.135-198 ₁ MP 1808 Evaluation of a biaxial ice stress sensor (1984, p.349-361)	Cost of land treatment systems [1979, 135p.] MP 1387
preliminary analysis [1984, 11p. + figs.] MP 1745 Observations during BRIMPROST '83 [1984, 36p.]	MP 1836 Preliminary investigation of thermal ice pressures (1984,	Problems with rapid infiltration—a post mortem analysis [1984, 17p. + figs.] MP 1944
SR 84-10 Colloquium on Planetary Water and Polar Processes, 2nd,	p.221-229 MP 1788 Authors' response to discussion on: Electromagnetic proper-	Crook, L. Pailure of an ice bridge (1976, 13p.) CR 76-29
Henover, N.H., Oct. 16-18, 1978 Proceedings [1978, 209p.] MP 1193	ties of sea ice (1984, p.95-97) MP 1822 Structure, salinity and density of multi-year sea ice pressure	Crory, F.E. Piles in permafrest for bridge foundations (1967, 41p.)
Collegatum on Water in Planetary Regoliths, Hanover, N.H., October 5-7, 1976	ridges (1985, p.194-198) MP 1857 Tensile strength of multi-year pressure ridge sea ice samples	MP 1411 Design considerations for airfields in NPRA [1978, p.441-
Proceedings [1977, 161p.] MP 911	(1985, p.186-193) MP 1836 Summary of the strength and modulus of ice samples from	446
Comiso, J.C. Antarctic sea ice microwave signatures and their correlation	multi-year pressure ridges [1985, p.93-98] MP 1848 Preliminary examination of the effect of structure on the com-	Kotzebue hospital—a case study [1978, p.342-359] MP 1084
with in situ ice observations [1984, p.662-672] MP 1668	pressive strength of ice samples from multi-year pressure ridges (1985, p.99-102) MP 1849	Design and construction of temporary airfields in the National Petroleum Reserve—Alaska [1978, p.13-15]
Condike, B.J. Treatment of primary sewage effluent by rapid infiltration	Triaxial compression testing of ice [1985, p.476-488] MP 1878	Use of piling in frozen ground [1980, 21 p.] MP 1407
[1976, 15p.] CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devens,	Effect of sample orientation on the compressive strength of	Piling in frozen ground [1982, p.112-124] MIP 1722 Designing for frost heave conditions [1984, p.22-44]
Massachusetts [1976, 34p.] CR 76-48 Coon, M.D.	multi-year pressure ridge ice samples [1985, p.465-475] MP 1877	MP 1705 Crosby, R.L.
Remote sensing program required for the AIDJEX model [1974, p.22-44] MP 1040	Sheet ice forces on a conical structure: an experimental study [1985, p.46-54] MP 1915	Thermal energy and the environment [1975, 3p. + 2p. figs.] MP 1480
Cooper, S. New England reservoir management: Land use/vegetation	Experience with a biaxial ice stress sensor [1985, p.252- 258] MP 1937	Crowder, W.R. Mesoscale deformation of sea ice from satellite imagery
mapping in reservoir management (Merrimack River basin) [1974, 30p.] MP 1039	Sheet ice forces on a conical structure: an experimental study [1985, p.643-655] MP 1906	(1973, 2p. ₁ MP 1120
Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables)	Kadluk ice stress measurement program [1985, p.88-100] MP 1899	Arctic and aubarctic environmental analysis utilizing ERTS- 1 imagery. Final report June 1972-Feb. 1974 (1974, 1280-) MP 1047
MP 913 Preliminary analysis of water equivalent/snow characteristics	Tensile strength of multi-year pressure ridge sea ice samples [1985, p.375-380] MP 1908	Cullinane, M.J., Jr.
using LANDSAT digital processing techniques [1977, 16 leaves] MP 1113	Mechanical properties of multi-year sea ice. Phase 2: Test results [1985, 81p.] CR 85-16	Land treatment processes within CAPDET (Computer-assist- ed procedure for the design and evaluation of wastewater
Use of the Landsat data collection system and imagery in reservoir management and operation (1977, c150p.)	Structure, salinity and density of multi-year sea ice pressure ridges (1985, p.493-497) MP 1965	treatment systems) [1983, 79p.] SR 83-26 Cummings, N.H.
MP 1114 Effect of inundation on vegetation at selected New England	Ice properties in a grounded man-made ice island [1986, p.135-142] MP 2032	Cold Regions Science and Technology Bibliography (1981, p.73-75) MP 1372
flood control reservoirs (1978, 13p.) MP 1169	Confined compressive strength of multi-year pressure ridge	Cundy, D.F. Pooling of oil under sea ice [1981, p.912-922]
Snow cover mapping in northern Maine using LANDSAT digital processing techniques (1979, p.197-198] MP 1510	ses ice samples [1986, p.365-373] MP 2035 Comparison of two constitutive theories for compressive	MP 1459
Corey, M.W.	deformation of columnar sea ice (1986, p.241-252) MP 2124	Salmon River ice jams (1984, p.529-533) MP 1796
Land treatment processes within CAPDET (Computer-assist- ed procedure for the design and evaluation of wastewater	Coyne, P.I. Carbon dioxide dynamics on the Arctic tundra (1971, p.48-	Curcle, J.A. Visible propagation in falling snow as a function of mass con-
treatment systems) [1983, 79p.] SR 83-26 Coulombe, H.N.	52 ₁ MP 903 CO2 exchange in the Alaskan Arctic tundra: meteorological	centration and crystal type [1983, p.103-111] MP 1757
Synthesis and modeling of the Barrow, Alaska, ecosystem [1970, p.44-49] MP 944	assessment by the aerodynamic method [1972, p.36-39, MP 1375	Currier, J.H. Study on the tensile strength of ice as a function of grain size
Word model of the Barrow ecosystem [1970, p.41-43] MP 943	Case for comparison and standardization of carbon dioxide reference gases [1973, p.163-181] MP 964	(1983, 38p.) ČR 83-14 Cuymon, G.L.
Contormarsh, B.A. Roof moisture survey: Reserve Center Garage, Grenier Field,	Cragin, J.H. Vanadium and other elements in Greenland ice cores (1976,	Mathematical model to correlate frost heave of pavements with laboratory predictions [1980, 49p.] CR 80-10
Manchester, N.H. (1981, 18p.) Manchester, N.H. (1981, 18p.) SR 81-31 Moisture detection in roofs with cellular plastic insulation—	4p. _j CR 76-24 Vanadium and other elements in Greenland ice cores (1997,	Daly, C.J. Integral transform method for the linearized Boussiness
West Point, New York, and Manchester, New Hampshire 1982, 22p.) SR 82-07	p.98-102 ₁ MP 1092	groundwater flow equation [1981, p.875-884] MP 1470
Can wet roof insulation be dried out [1983, p.626-639] MP 1509	Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits [1977, p.302-306] MP 1094	Evaluation of procedures for determining selected aquifer parameters (1982, 104p.) CR 82-41
U.S. Air Porce roof condition index survey: Pt. Greely, Alaska (1984, 67p.)	Atmospheric trace metals and sulfate in the Greenland Ice Sheet 1977, p.915-9201 MP 949	Calculation of advective mass transport in heterogeneous media (1983, p.73-89) MP 1697
	*** *** ***	

Daly, C.J. (cout.)	Delancy, A.J.	Diceft, G.
Procedure for calculating groundwater flow lines [1984, 42p ₂] SR 84-09	Airborne resistivity and magnetometer survey in northern Maine for obtaining information on bedrock geology (1976, 19p.) CR 76-37	Pooling of oil under sea ice [1981, p.912-922] MP 145
Daly, S.F. Modeling hydrologic impacts of winter navigation [1981,	Selected examples of radiohm resistivity surveys for geotech-	Diener, C.J. Seven-year performance of CRREL slow-rate land treatment
p.1073-1080 _j MP 1445 Prediction of ice growth and circulation in Kachemak Bay,	nical exploration [1977, 16p.] SR 77-01 Preliminary evaluation of new LF radiowave and magnetic	prototypes [1981, 25p.] SR 81-1 Development of a rational design procedure for overland flo
Bradley Lake Hydroelectric Project [1982, p.(C)1-(C)9] MP 1501	induction resistivity units over permafrost terrain r 1977, p.39-42; MP 925	systems (1982, 29p.) CR 82-6 Pilot-scale evaluation of the nutrient film technique for was
Force distribution in a fragmented ice cover [1982, p.374-	Interaction of a surface wave with a dielectric slab discontinuity [1978, 10p.] CR 78-08	tewater treatment [1982, 34p.] SR 82-2
387 ₁ MP 1531 Application of HEC-2 for ice-covered waterways (1982,	Shallow electromagnetic geophysical investigations of perma-	Assessment of the treatability of toxic organics by overlan flow [1983, 47p.] CER 83-6
p.241-248 ₁ MP 1575 Using the DWOPER routing model to simulate river flows	frost [1978, p.501-507] MP 1101 Electrical ground impedance measurements in the United	Nitrogen removal in cold regions trickling filter system [1986, 39p.] SR 86-6
with ice [1983, 19p.] SR 83-01	States between 200 and 415 kHz (1978, 92p.) MP 1221	Dilan, W.S.
Frazil ice (1983, p.218-223) MP 2078 Force distribution in a fragmented ice cover (1984, 16p.)	Electromagnetic geophysical survey at an interior Alaska per-	Summer conditions in the Prudhoe Bay area, 1953-75 (1981, p.799-808) MP 145
Frazil ice dynamics [1984, 46p.] CR \$4-07 Frazil ice dynamics [1984, 46p.]	Detection of Arctic water supplies with geophysical tech-	Dingeldein, J.E. Winter earthwork construction in Upper Michigan (1977)
St. Lawrence River freeze-up forecast [1984, p.177-190]	niques [1979, 30p.] CR 79-15 Effects of seasonal changes and ground ice on electromagnet-	59p. ₁ SR 77-4 Dingman, S.I.,
MP 1713 Forecasting water temperature decline and freeze-up in rivers	ic surveys of permafrost [1979, 24p.] CR 79-23 Delineation and engineering characteristics of permafrost	Hydrology and climatology of the Caribou-Poker Creeks Re
[1984, 17p.] CR 84-19 Dynamics of frazil ice formation [1984, p.161-172]	beneath the Beaufort Sea [1979, p.93-115] MP 1287	search Watershed, Alaska [1982, 34p.] CR 82-2 Dittemore, H.R.
MP 1829	Low-frequency surface impedance measurements at some glacial areas in the United States (1980, p.1-9) MP 1280	Effect of seasonal soil conditions on the reliability of the M1 land mine [1984, 35p.] SR 84-1
Ice block stability [1984, p.544-548] MP 1972 Data acquisition in USACRREL's flume facility [1985,	HF to VHF radio frequency polarization studies in sea ice at Pt. Barrow, Alaska [1980, p.225-245] MP 1324	Doe, W.W., III
	Delineation and engineering characteristics of permafrost	Historical bank recession at selected sites along Corps of Er gineers reservoirs [1983, 103p.] SR 83-3
USACRREL precise thermistor meter [1985, 34p.] SR 85-26	beneath the Beaufort Sea [1981, p.125-157] MP 1428 Hyperbolic reflections on Beaufort Sea seismic records	Upper Delaware River ice control—a case study [1986, p.760-770] NIP 200
Frazil ice measurements in CRREL's flume facility (1986, p.427-438) MP 2127	[1981, 16p.] CR 81-02 VHP electrical properties of frozen ground near Point Barrow,	Doerflinger, D.F.
Danagaard, W.	Alaska (1981, 18p.) CR 81-13 Delineation and engineering characteristics of permafrost	Tundra lakes as a source of fresh water: Kipnuk, Alask [1979, 16p.] SR 79-3
Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22] MP 998	beneath the Beaufort Sea [1981, p.137-156] MP 1600	Domack, E.W. Pebble fabric in an ice-rafted diamicton [1985, p.577-591]
Oxygen isotope profiles through the Antarctic and Greenland	Measurement of ground dielectric properties using wide-angle reflection and refraction [1982, 11p.] CR 82-96	MP 195
ice sheets [1972, p.429-434] MP 997 Stable isotope profile through the Ross Ice Shelf at Little	Laboratory measurements of soil electric properties between 0.1 and 5 GHz [1982, 12p.] CR 82-10	Drapter-Arsenselt, L. Ice dynamics in the Canadian Archipelage and adjacent Archipelage and
America V, Antarctica [1977, p.322-325] MP 1095	Improving electric grounding in frozen materials [1982,	tic basin as determined by ERTS-1 observations [1975, p.853-877] MP 156
Davemport, C.V. Fate and effects of crude oil spilled on subarctic permafrost	12p. ₁ SR 82-13 Dielectric properties of thawed active layers overlying perma-	Drew, A.R. Ice flow leading to the deep core hole at Dye 3, Greenlan
terrain in interior Alaska [1980, 128p.] MP 1310 Fate and effects of crude oil spilled on subarctic permafrost	frost using radar at VHF (1982, p.618-626) MP 1547 Electrical properties of frozen ground at VHF near Point Bar-	[1984, p.185-190] MP 182
terrain in interior Alaska [1980, 67p.] CR 80-29	row, Alaska [1982, p.485-492] MIP 1572	Dudley, T. CRREL roof moisture survey, Pease AFB Buildings 33, 110
Davidson, G. Water percolation through homogeneous snow [1973, p.242-	Radar profiling of buried reflectors and the groundwater table [1983, 16p.] CR 83-11	122 and 205 [1977, 10p.] SE 77-6 Infrared detective: thermograms and roof moisture [1977,
257 ₃ MP 1025 Dean, A.M., Jr.	Field dielectric measurements of frozen silt using VHF pulses [1984, p.29-37] MP 1774	p.41-44 ₁ NiP 96
Remote sensing of accumulated frazil and brash ice in the St.	Conductive backfill for improving electrical grounding in frozen soils [1984, 19p.] SR 84-17	Roof moisture survey: ten State of New Hampshire building [1977, 29p.] CR 77-3
Lawrence River (1977, 19p.) CR 77-08 Remote sensing of accumulated frazil and brash ice (1977,	Dielectric measurements of frozen silt using time domain re-	CRREL roof moisture survey, Building 208 Rock Island Arectal [1977, 6p.] SR 77-4
p.693-704 ₁ MP 934 Investigation of automatic data collection equipment for	flectometry [1984, p.39-46] MP 1775 Large-size coaxial waveguide time domain reflectometry unit	Duggen, G.
oceanographic applications [1978, p.1111-1121] MP 1028	for field use [1984, p.428-431] MP 2048 Radar investigations above the trans-Alaska pipeline near	Methodology used in generation of snow load case historic [1977, p.163-174] MIP 114
Evaluation of ice-covered water crossings [1980, p.443-	Fairbanks [1984, 15p.] CR 84-27	Dukeshire, D.E. Influence of insulation upon frost penetration beneath pave
453 ₁ MP 1348 Method for measuring brash ice thickness with impulse radar	Mapping resistive scabed features using DC methods (1985, p.136-147) MP 1918	ments [1975, 41p.] SR 76-0 Dumout, N.
(1981, 10p.) SR 81-11 Electromagnetic subsurface measurements (1981, 19p.)	Galvanic methods for mapping resistive scabed features [1985, p.91-92] MIP 1955	Catalog of Snow Research Projects [1975, 103p.] MP 112
SR 81-23	Dielectric studies of permafrost using cross-borehole VHF pulse propagation [1985, p.3-5] MP 1951	Dunbar, M.
Field investigations of a hanging ice dam [1982, p.475-488] MP 1533	Dempsey, B.J.	MIZEX—a program for mesoscale air-ice-ocean interactio experiments in Arctic marginal ice zones. 2. A science
Lake water intakes under icing conditions [1983, 7p.] CR 83-15	Projected thermal and load-associated distress in pavements incorporating different grades of asphalt cement 1978,	plan for a summer Marginal Ice Zone Experiment in the Pram Strait/Greenland Sea: 1984 [1983, 47p.]
Modeling intake peformance under frazil ice conditions [1984, p.559-563] MP 1797	p.403-437 ₁ MP 1209 Asphalt concrete for cold regions; a comparative laboratory	SR \$3-1
Decato, S.	study and analysis of mixtures containing soft and hard grades of asphalt cement [1980, 55p.] CR 80-05	Dunn, I.S. Wastewater stabilization pond linings (1978, 116p.) SR 78-2
MIZEX 84 mesoscale sea ice dynamics: post operations re- port [1984, p.66-69] MP 1257	Dempsey, J.P. Fracture toughness of model ice [1986, p.365-376]	Dunne, T.
Deck, D.S. Growth rates and characteristics of ice on the Ottauquechee	MP 2125	Energy balance and runoff from a subarctic snowpack (1976, 29p.) CR 76-2
and Winooski Rivers of Vermont during winter 1977-78	Deneke, F.J. Upland aspen/birch and black spruce stands and their litter	Generation of runoff from subarctic snowpacks (1976, P.677-685)
Analysis of velocity profiles under ice in shallow streams	and soil properties in interior Alaska [1976, p.33-44] MP 867	Durell, G.
[1981, p.94-111] MP 1397 Ice jam problems at Oil City, Pennsylvania [1981, 19p.]	Fate and effects of crude oil spilled on permafrost terrain. First year progress report (1976, 18p.; SR 76-15	Repeated load triaxial testing of frozen and thawed soing 1985, p.166-170; MP 206
SR 81-09 Port Huron ice control model studies [1982, p.361-373]	DenHartog, S.L.	Durham, W.B. Mechanisms of crack growth in quartz [1975, p.4837-4844]
MP 1530	Cantilever beam tests on reinforced ice [1976, 12p.]	MP #
Model study of Port Huron ice control structure; wind stress simulation [1982, 27p.] CR 82-09	Failure of an ice bridge [1976, 13p.] CR 76-29	Durrell, G. Mechanical properties of multi-year sea ice. Phase 2: Ter
Resistance coefficients from velocity profiles in ice-covered shallow streams [1982, p.236-247] MP 1540	Air photo interpretation of a small ice jam (1977, p.705-719) MP 935	results [1985, 81p.] CR 85-1 Dutta, P.K.
Force measurements and analysis of river ice break up [1982,	Aeriai photointerpretation of a small ice jam [1977, 17p.] SR 77-32	Some recent developments in vibrating wire rock mechanic
p.303-336j MP 1739 Hydraulic model study of Port Huron ice control structure	Firn quake (a rare and poorly explained phenomenon) (1982, p.173-174) MP 1571	instrumentation (1985, 12p.) MIP 196 Dyer, I.
[1982, 59p.] CR 82-34 Performance of the Allegheny River ice control structure,	Denner, W.W.	MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 2. A science
1983 [1984, 15p.] SR 84-13	"Pack ice and icebergs"—report to POAC 79 on problems of the seasonal sea ice zone: an overview (1979, p.320-337)	plan for a summer Marginal Ice Zone Experiment in th Fram Strait/Greenland Sea: 1984 [1983, 47p.]
Controlling river ice to alleviate ice jam flooding (1984, p.524-528) MP 1795	MP 1320 Dennia, J.G.	SR 83-1 Marginal ice zones: a description of air-ice-ocean interactiv
Controlling river ice to alleviate ice jam flooding (1984, p.69-76) MP 1885	Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1804	processes, models and planned experiments [1984, p.133-
Dehn, W.F.	Denoth, A.	146 ₁ MP 167 Earlekson, J.
Islands of grounded sea ice (1976, 24p.) CR 76-04	Study of water drainage from columns of snow [1979, 199.]	Potential solution to ice jam flooding: Salmon River, Idah

Earle, E.N. 4th report of working group on testing methods in ice [1984,	Eastein, S. On the origin of stratified debris in ice cores from the bottom	Analysis of diffusion wave flow routing model with applica- tion to flow in tailwaters (1983, 31p.) CR \$3-07
p.1-41 ₁ MP 1886	of the Antarctic ice sheet [1979, p.185-192]	Unsteady river flow beneath an ice cover (1983, p.254-260)
Rates, R.A.	MP 1272 Erenti, E.	MP 2079
Influence of insulation upon frost penetration beneath pave- ments (1976, 41p.) SR 76-96	Dynamic ice-structure interaction analysis for narrow vertical	Modeling rapidly varied flow in tailwaters [1984, p.27]- 289] MP 1711
Pavement recycling using a heavy bulldozer mounted pulver-	structures [1981, p.472-479] MP 1456	Analysis of rapidly varying flow in ice-covered rivers 1984,
izet [1977, 12p. + appends.] SR 77-30 Repetitive loading tests on membrane enveloped road sec-	Eritsch, F.H. Effects of inundation on six varieties of turigrass (1982).	p.359-368 ₁ MP 1833 Observations of volcanic tremor at Mount St. Helens volcano
tions during freeze thaw [1977, p.171-197] MP 962	25p. ₁ SR 82-12	[1984, p.3476-3484] MP 1778
Repetitive loading tests on membrane-enveloped road sec-	Esch, D.	Analysis of river wave types [1985, p.209-220]
tions during freeze-thaw cycles [1978, 16p.] CR 78-12	Yukon River breakup 1976 (1977, p.592-596) MP 960 Survey of methods for classifying frost susceptibility (1984,	MP 1875 Analysis of river wave types [1985, 17p.] CR 85-12
Temperature effects in compacting an asphalt concrete over-	p.104-141j MP 1707	Pich, A.M.
lay [1978, p.146-158] MP 1083 Effects of subgrade preparation upon full depth pavement	Esch, D.C.	Acoustic and pressuremeter methods for investigation of the
performance in cold regions (1978, p.459-473)	Effect of color and texture on the surface temperature of asphalt concrete pavements [1983, p.57-61] MP 1652	rheological properties of ice [1978, 196p.] MP 1988 Kinetic nature of the long term strength of frozen soils [1980,
MP 1687 Repetitive loading tests on membrane enveloped road sec-	Frost heave forces on piling (1985, 2p.) MP 1732	p.95-108 ₁ MP 1450
tions during freeze-thaw cycles (1978, p.1277-1288)	Frost jacking forces on H and pipe piles embedded in Fair-	Acoustic emissions during creep of frozen soils [1982, p.194-
MP 1158	banks silt [1985, p.125-133] MP 1930 Ettema, R.	2061 MP 1495 Comparative analysis of the USSR construction codes and the
Full-depth pavement considerations in seasonal frost areas (1979, 24p.) MP 1188	Frazil ice formation [1984, 44p.] CR 84-18	US Army technical manual for design of foundations on
Nondestructive testing of in-service highway pavements in	Evans, R.J.	permafront [1982, 20p.] CR 82-14
Maine [1979, 22p.] CR 79-06 New Hampshire field studies of membrane encapsulated soil	Small-scale strain measurements on a glacier surface [1971, p.237-243] MP 993	Deformation and failure of frozen soils and ice at constant and steadily increasing stresses [1982, p.419-428]
layers with additives [1980, 46p.] SR 80-33	Everett, K.R.	MP 1553
Structural evaluation of porous pavement test sections at	Effects of low-pressure wheeled vehicles on plant communi-	Thermal patterns in ice under dynamic loading [1983, p.240- 243] MP 1742
Walden Pond State Reservation, Concord, Massachusetts [1980, 43p.] SR 80-39	ties and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17	Comparison of U.S.S.R. codes and U.S. Army manual for
Field cooling rates of asphalt concrete overlays at low temper-	Geoecological mapping scheme for Alaskan coastal tundra	design of foundations on permafrost (1983, p.3-24) MP 1682
atures [1980, 11p.] CR 80-30 Pothole primer; a public administrator's guide to understand-	[1978, p.359-365] MP 1098 Fate of crude and refined oils in North Slope soils [1978,	Thermodynamic model of creep at constant stresses and con-
ing and managing the pothole problem (1981, 24p.)	p.339-347 ₁ MP 1186	stant strain rates [1983, 18p.] CR 83-33
MP 1416	Effects of crude and diesel oil spill on plant communities at	Thermodynamic model of creep at constant stress and constant strain rate (1984, p.143-161) MP 1771
Fabric installation to minimize reflection cracking on taxi- ways at Thule airbase, Greenland [1981, 26p.]	Prudehoe Bay, Alaska, and the derivation of oil spill sen- sitivity maps [1978, p.242-259] MP 1184	stant strain rate (1984, p.143-161) MP 1771 Creep model for constant stress and constant strain rate
SR 81-10	Tundra disturbances and recovery following the 1949 ex-	[1984, p.1009-1012] MP 1766
Pothole primer—a public administrator's guide to under- standing and managing the pothole problem [1981, 24p.]	ploratory drilling, Fish Creek, Northern Alaska (1978, 81p.)	Tertiary creep model for frozen sands (discussion) [1984, p.1373-1378] MP 1810
SR 81-21	Geobotanical atlas of the Prudhoe Bay region, Alaska (1980,	Creep strength, strain rate, temperature and unfrozen water
Potholes: the problem and solutions (1982, p.160-162) MP 1504	69p. ₁ CR 80-14	relationship in frozen soil [1985, p.29-36] MP 1928
Full-depth and granular base course design for frost areas	Coastal tundra at Barrow (1980, p.1-29) MP 1356 Distribution and properties of road dust along the northern	Flak, D. Snow calorimetric measurement at SNOW-ONE [1982,
(1983, p.27-39) MP 1492	portion of the Haul Road [1980, p.101-128]	p.133-138 ₁ MP 1986
Engineer's pothole repair guide [1984, 12p.] TD 84-01 Strategies for winter maintenance of pavements and roadways	MP 1352	Snow characterization at SNOW-ONE-B (1983, p.155-
(1984, p.155-167 _] MP 1964	Tundra and analogous soils [1981, p.139-179] MP 1405	195 ₁ MP 1847 Secondary stress within the structural frame of DYE-3: 1978-
Comparison of three compactors used in pothole repair [1984, 14p.] SR 84-31	Some recent trends in the physical and chemical characteriza-	1983 [1984, 44p.] SR 84-26
[1984, 14p.] SR 84-31 Ebersole, J.F.	tion and mapping of tundra soils, Arctic Slope of Alaska [1982, p.264-280] MP 1552	Fisk, D.J.
Utilization of the anow field test series results for development	Landsat-assisted environmental mapping in the Arctic Na-	Performance of overland flow land treatment in cold climates [1978, p.61-70] MP 1152
of a snow obscuration primer (1983, p.209-217) MP 1692	tional Wildlife Refuge, Alaska [1982, 39p. + 2 maps] CR 82-37	Free water measurements of a snowpack [1983, p.173-176]
Snow-Two/Smoke Week VI field experiment plan [1984,	Observations on ice-cored mounds at Sukakpak Mountain,	MP 1758
85p. ₃ SR 84-19	south central Brooks Range, Alaska [1983, p.91-96] MP 1653	Progress in methods of measuring the free water content of anow [1983, p.48-51] MP 1649
Helicopter snow obscuration sub-test (1984, p.359-376) MP 2094	Sensitivity of plant communities and soil flora to seawater	100 MHz dielectric constant measurements of snow cover:
Explosive obscuration sub-test results at the SNOW-TWO	spills, Prudhoe Bay, Alaska [1983, 35p.] CR 83-24	dependence on environmental and snow pack parameters [1985, p.829-834] MP 1913
field experiment [1984, p.347-354] MP 1872 Edwardo, H.A.	Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and addi-	Flanders, S.N.
Ohio River main stem study: the role of geographic informa-	tions to the checklist of flors [1985, 75p.] CR 85-11	Reinsulating old wood frame buildings with urea-formalde-
tion systems and remote sensing in flood damage assess-	Faiter, C.M.	hyde foam (1977, p.478-487) MP 958 Maintaining buildings in the Arctic (1977, p.244-251)
ments [1984, p.265-281] MP 2083 Spatial analysis in recreation resource management for the	Limnological investigations: Lake Koocanusa, Montana. Part 4: Pactors controlling primary productivity 1982,	MP 1508
Berlin Lake Reservoir Project [1984, p.209-219]	106p. ₁ SR 82-15	Operation of the CRREL prototype air transportable shelter
MP 2084 Edwards, A.P.	Fanale, F.P. Mars soil-water analyzer: instrument description and status	[1980, 73p.] SR 80-10 Time constraints on measuring building R-values [1980,
Guide to the use of 14N and 15N in environmental research	(1977, p.149-158) MP 912	30p.; CJR 80-15
(1978, 77p.) SR 78-18	Farmer, W.M.	Measuring building R-values for large areas (1981, p.137- 138) MP 1388
Use of 15N to study nitrogen transformations in land treat- ment (1979, 32p.) SR 79-31	Snow-Two/Smoke Week VI field experiment plan [1984, 85p.] SR 84-19	Window performance in extreme cold [1981, p.396-408]
Dynamics of NH4 and NO3 in cropped soils irrigated with	Faronki, O.	MP 1393
wastewater [1980, 20p.] SR 80-27 Eff, K.S.	Evaluation of methods for calculating soil thermal conductivi-	Cold regions testing of an air-transportable shelter [1981, 20p.]
Storm drainage design considerations in cold regions [1978,	ty ₁ 1972, 90p. ₁ CR 82-08 Ferrouki, O.T.	Designing with wood for a lightweight air-transportable Arc-
p.474-489 ₁ MP 1066	Thermal properties of soils [1981, 136p.] M 81-01	tic shelter: how the materials were tested and chosen for design 1982, p.385-397; MP 1558
Surface drainage design for airfields and heliports in arctic and subarctic regions (1981, 56p.) SR 81-22	Ferrell, D.	design [1982, p.385-397] MP 1558 Least life-cycle costs for insulation in Alaska [1982, 47p.]
Egan, W.G.	Ice penetration tests [1984, p.209-240] MP 1996 Ice penetration tests [1985, p.223-236] MP 2014	
Meteorological variation of atmospheric optical properties in an antarctic storm [1986, p.1155-1165] MP 2099	Parrell, D.R.	Window performance in extreme cold [1982, 21p.] CR 82-38
Elechi, C.	Bullet penetration in snow [1979, 23p.] SR 79-25	Toward in-situ building R-value measurement (1984, 13p.)
Imaging radar observations of frozen Arctic lakes 1976,	Test of anow fortifications [1979, 15p.] SR 79-33	CR 84-01
p.169-175 ₁ MP 1284 Elgawhary, S.M.	Snow fortifications as protection against shaped charge antitank projectiles [1980, 19p.] SR 80-11	Measuring thermal performance of building envelopes: nine case studies [1985, 36p.] CR 85-07
Evaluation of nitrification inhibitors in cold regions land	Funcher, M.	Heat flow sensors on walls-what can we learn (1985, p.140-
treatment of wastewater: Part 1. Nitrapyrin [1979, 25p.]	In-situ thermoconductivity measurements [1986, p.13-14] MP 2137	149 ₁ MP 2042
SR 79-18 Ellingwood, B.	Pehler, M.	Measured and expected R-values of 19 building envelopes r1985 n.49-571 MP 2115
Ground snow loads for structural design [1983, p.950-964]	Observations of volcanic tremor at Mount St. Helens volcano	Poley, B.T.
MP 1734 Probability models for annual extreme water-equivalent	[1984, p.3476-3484] MP 1770 Ferrick, M.G.	Assessment of the treatability of toxic organics by overland flow [1983, 47p.] CR 83-03
ground know (1984, p.1153-1159) MIP 1823	Experimental investigation of potential icing of the space	flow [1983, 47p.] CR 83-03 Impact of slow-rate land treatment on groundwater quality:
Elifott, D. Boss Jos Sholf Desirat assistant and impact attachment July	abuttle external tank (1982, 305p.) CR 82-25	toxic organics (1984, 36p.) CR 84-30
Ross Ice Shelf Project environmental impact statement July, 1974 (1978, p.7-36) MP 1075	Fluid dynamic analysis of volcanic tremor [1982, 12p.] CR 82-32	Suitability of polyvinyl chloride pipe for monitoring TNT, RDX, HMX and DNT in groundwater [1985, 27p.]
Epps, J.W.	Source mechanism of volcanic tremor [1982, p.8675-8683]	SR 85-12
Land treatment processes within CAPDET (Computer-assist- ed procedure for the design and evaluation of wastewater	MP 1576 On zero-inertia and kinematic waves [1982, p.1381-1387]	Sample digestion and drying techniques for optimal recovery
treatment systems) [1983, 79p.] SR 83-26	On zero-inertia and kinematic waves [1982, p.1381-1387] MP 2053	Sample digestion and drying techniques for optimal recovery of mercury from soils and sediments [1985, 16p.] SR 85-16

Poley, B.T. (cont.)	Pavement recycling using a heavy bulldozer mounted pulver- izer [1977, 12p. + appends.] SR 77-30	Inlet current measured with Seasat-1 synthetic aperture radar (1980, p.35-37) MP 1443
TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses (1985, 11p.)	izer [1977, 12p. + appends.] SR 77-36 Canol Pipeline Project: a historical review [1977, 32p.] SR 77-34	Ice distribution and winter surface circulation patterns, Ka-
CR 85-15 Foley, E.S.	SR 77-34	chemak Bay, Alaska [1981, p.995-1001] MP 1442
Five-year performance of CRREL land treatment test cells;	1977 CRREL-USGS permafront program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41	Ice distribution and winter surface circulation patterns, Ka- chemak Bay, Alaska [1981, 43p.] CR 81-22
water quality plant yields and nutrient uptake [1978,	Waterproofing strain gages for low ambient temperatures	Shoreline conditions and bank recession along the U.S. shore-
24p. ₁ SR 78-26 Foltyn, E.P.	(1978, 20p.) SR 78-15 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska	lines of the St. Marys, St. Clair, Detroit and St. Lawrence rivers [1982, 75p.] CR \$2-11
St. Lawrence River freeze-up forecast (1984, p.177-190)	[1979, 45p.] CIR 79-07	Ice distribution and winter surface circulation patterns, Ka-
MP 1713 Forecasting water temperature decline and freeze-up in rivers	Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16]	chemak Bay, Alaska [1982, p.421-435] MP 1569 Reservoir bank erosion caused and influenced by ice cover
(1984, 17p.) CR 84-19	MP 1217	[1982, 26p.] SR 82-31
St. Lawrence River freeze-up forecast [1986, p.467-481] MP 2120	Movement study of the trans-Alaska pipeline at selected sites [1981, 32p.] CR 81-04	Historical bank recession at selected sites along Corps of En- gineers reservoirs [1983, 103p.] SR 83-30
Forland, K.A.	Gerrison, D.L.	Overview of Tanana River monitoring and research studies
Laboratory investigation of the kinetic friction coefficient of ice £1984, p.19-28 ₁ MP 1825	Physical mechanism for establishing algal populations in frazil ice (1983, p.363-365) MP 1717	near Pairbanks, Alaska (1984, 98p. + 5 appends.) SR 84-37
ice [1984, p.19-28] MP 1825 Kinetic friction coefficient of ice [1985, 40p.] CR 85-06	ice (1983, p.363-365) MP 1717 Sea ice microbial communities in Antarctica (1986, p.243-	Bank recession and channel changes in the area near the
Laboratory and field studies of ice friction coefficient (1986,	250 ₎ MP 2026	North Pole and floodway sill groits, Tanana River, Alaska (1984, 98p.) MP 1747
p.389-400j MP 2126 Fountain, A.G.	Gertner, K.E. Mathematical model to predict frost heave [1977, p.92-	Relationships among bank recession, vegetation, soils, sedi-
Break-up dates for the Yukon River; Pt.1. Rampart to White-	109 ₁ MP 1131	ments and permafrost on the Tanana River near Pairbanks, Alaska (1984, 59p.) MP 1746
horse, 1896-1978 (1979, c50 ieaves; MP 1317 Break-up dates for the Yukon River; Pt.2. Alakanuk to Tana-	Gaskin, D.A. Utilization of sewage sludge for terrain stabilization in cold	Relationships among bank recession, vegetation, soils, sedi-
na, 1883-1978 [1979, c50 leaves] MP 1318	regions [1977, 45p.] SR 77-37	ments and permafrost on the Tanana River near Fairbanks, Alaska [1984, 53p.] SR 84-21
Fowler, M.G. Results of the US contribution to the Joint US/USSR Bering	Performance of overland flow land treatment in cold climates [1978, p.61-70] MP 1152	Reservoir bank erosion caused by ice (1984, p.203-214)
Sea Experiment [1974, 197p.] MP 1032	Utilization of sewage sludge for terrain stabilization in cold	MP 1787
Frank, M.	regions, Part 2 [1979, 36p.] SR 79-28	Use of remote sensing for the U.S. Army Corps of Engineers dredging program [1985, p.1141-1150] MIP 1890
De-icing of radomes and lock walls using pneumatic devices 1977, p.467-478 ₁ MP 1064	Utilization of sewage sludge for terrain stabilization in cold regions. Pt. 3 [1979, 33p.] SR 79-34	Vertically stable benchmarks: a synthesis of existing informa-
Laboratory experiments on lock wall deicing using pneumatic	Revegetation at two construction sites in New Hampshire and	tion (1985, p.179-188) MP 2069 Ice conditions on the Ohio and Illinois rivers, 1972-1985
devices [1977, p.53-68] MP 974 Characterization of the surface roughness and floe geometry	Alasks (1980, 21p.) CR 80-03 Chena River Lakes Project revegetation study—three-year	[1985, p.856-861] MP 1914
of the sea ice over the continental shelves of the Beaufort	summary [1981, 59p.] CR 81-18	Potential of remote sensing in the Corps of Engineers dredg- ing program (1985, 42p.) SR 45-20
and Chukchi Seas [1977, p.32-41] MP 1163 Sea ice ridging over the Alaskan continental shelf [1979,	Sewage aludge aids revegetation (1982, p.198-301) MP 1735	Ganthier, B.
24p. _] CR 79-08	Gaskin, P.N.	Extraction of topography from side-looking satellite systems
Sea ice ridging over the Alaskan continental shelf [1979, p.4885-4897] MP 1240	Survey of methods for classifying frost susceptibility [1984, p.104-141] MP 1707	—a case study with SPOT simulation data [1983, p.535-550] MP 1695
Frankenstein, G.E.	p.104-141 ₁ MP 1707 Gatto, L.W.	Genthier, J.F.
Ice-cratering experiments Blair Lake, Alaska (1966, Various pagings) MP 1034	Arctic and Subarctic environmental analyses utilizing ERTS-	Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model-
Use of explosives in removing ice jams [1970, 10p.]	1 imagery; bimonthly progress report, 23 June - 23 Aug. 1972 [1972, 3p.] MIP 991	ing {1984, 19p.; SR 84-01
MP 1021	Arctic and subarctic environmental analysis [1972, p.28-	Gavrile, V.P. Standardized testing methods for measuring mechanical prop-
River-ice problems: a state-of-the-art survey and assessment of research needs [1974, p.1-15] MP 1002	30 ₁ MP 1119 Baseline data on tidal flushing in Cook Inlet, Alaska (1973,	erties of ice [1981, p.245-254] MP 1556
Third International Symposium on Ice Problems (1975, 627p.) MP 845	11p. ₁ MP 1523	4th report of working group on testing methods in ice [1984, p.1-41] MP 1886
627p. ₁ MP 845 Ice removal from the walls of navigation locks [1976, p.1487-	Arctic and subarctic environmental analyses using ERTS-1 imagery. Progress report Dec. 72-June 73 [1973, 75p.]	Gaydos, L.
1496 ₁ MP 888	MP 1003	Landsat-assisted environmental mapping in the Arctic Na- tional Wildlife Refuge, Alaska (1982, 59p. + 2 maps)
Investigation of ice clogged channels in the St. Marys River [1978, 73p.] MP 1170	Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery [1973, 5p.] MP 1611	CR 82-37
Report of panel on testing in ice (1978, p.157-179, MP 1140	Arctic and subarctic environmental analyses utilizing ERTS-	Gerard, R.
Experience gained by use of extensive ice laboratory facilities	1 imagery. Bimonthly progress report, 23 Aug 23 Oct. 1973 [1973, 3p.] MP 1030	Ice-related flood frequency analysis: application of analytical estimates [1984, p.85-101] MP 1712
in solving ice problems [1980, p.93-103] MP 1301	Arctic and subarctic environmental analyses utilizing ERTS-	Ice jam research needs (1984, p.181-193) MP 1813
Methods of ice control [1983, p.204-215] MP 1642 Methods of ice control for winter navigation in inland waters	1 imagery. Bimonthly progress report, 23 Oct 23 Dec. 1973, 1973, 6p., MP 1031	Gervin, J.C. Landsat-4 thematic mapper (TM) for cold environments
(1984, p.329-337) MP 1831	Arctic and subarctic environmental analysis utilizing ERTS-	(1983, p.179-186) MP 1651
ice cover research—present state and future needs (1986, p.384-399) MP 2004	1 imagery. Final report June 1972-Feb. 1974 1974, 128p., MP 1047	Gilkey, A.K. Geobotanical studies on the Taku Glacier anomaly [1954,
Frederking, R.	New England reservoir management: Land use/vegetation	p.224-239 _] MP 1215
Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1556	mapping in reservoir management (Merrimack River basin) [1974, 30p.] MP 1039	Giovinetto, M.B.
4th report of working group on testing methods in ice (1984,	Applications of remote sensing for Corps of Engineers programs in New England (1975, 8p. + 14 figs. and tables)	Baseline acidity of ancient precipitation from the South Pole (1984, 7p.) CR 34-15
p.1-41; MP 1886 Freitag, D.R.	grams in New England (1975, 8p. + 14 figs. and tables) MP 913	Gloeraen, P.
Application of ice engineering and research to Great Lakes	Circulation and sediment distribution in Cook Inlet, Alaska	Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] MP 1032
problems [1972, p.131-138] MP 1615	[1976, p.205-227] MP 895 Baseline data on the oceanography of Cook Iniet, Aiaska	Integrated approach to the remote sensing of floating ice
Cold Regions Research and Engineering Laboratory 1978, p.4-6 ₁ MP 1251	(1976, 84p.) CR 76-25	[1977, p.445-487] MP 1069 Godfrey, R.
Friedman, I.	Skylab imagery: Application to reservoir management in New England [1976, 51p.] SR 76-07	Fabric installation to minimize reflection cracking on taxi-
Report on ice fall from clear sky in Georgia October 26, 1959 [1960, 31p. plus photographs] MP 1017	Environmental analyses in the Kootenai River region, Mon-	ways at Thule airbase, Greenland [1981, 26p.] SR 81-10
Promiser, H.	tana (1976, 53p.) SR 76-13 Effect of inundation on vegetation at selected New England	Goff, M.A.
C-14 and other isotope studies on natural ice [1972, p.D70- D92] MP 1052	flood control reservoirs (1978, 13p.) MP 1169	Investigation of the snow adjacent to Dye-2, Greenland [1981, 23p.] SR \$1-63
Fungcharoen, S.	Estuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques	Gögtia, M.
Characterization of the surface roughness and floe geometry of the sea ice over the continental shelves of the Beaufort	[1978, 79p.] CR 78-18	Mean characteristics of asymmetric flows: application to flow
and Chukchi Seas [1977, p.32-41] MP 1163	Shoreline changes along the outer abore of Cape Cod from Long Point to Monomoy Point [1978, 49p.]	below ice jams [1981, p.342-350] MP 1733 Asymmetric plane flow with application to ice jams [1983,
Gagnon, F. Cutting ice with high pressure water jets -1973 22n .	CR 78-17	p.1540-1556 ₁ MP 1645
Cutting ice with high pressure water jets [1973, 22p.] MP 1001	River channel characteristics at selected ice jam sites in Vermont [1978, 52p.] CR 78-25	Golden, K.M. Modeling of anisotropic electromagnetic reflection from sea
Gagnon, J.J. Deicing a satellite communication antenna (1980, 14p.)	Historical shoreline changes along the outer coast of Cape	ice [1980, p.247-294] MP 1325
SR 60-18	Cod (1979, p.69-90) MP 1502	Modeling of anisotropic electromagnetic reflection from sea ice [1980, 15p.] CR 80-23
Garcia, N.B.	Environmental analysis of the Upper Susitna River Basin using Landsat imagery [1980, 41p.] CR 80-04	Sea ice studies in the Weddell Sea aboard USCOC Polar Sea
lce penetration tests [1984, p.209-240] MP 1996 lce penetration tests [1985, p.223-236] MP 2014	Constal angles and both was and about at a constant	(1980, p.84-96) MP 1431 Modeling of anisotropic electromagnetic reflections from sea
Gerfield, D.E.	phy along the Beaufort, Chukchi and Bering Seas (1980, 357p.)	ice (1981, p.8107-8116) MP 1469
Resurvey of the "Byrd" Station, Antarctica, drill hole [1976, p.29-34] MP 846	Analysis of circulation patterns in Grays Harbor, Washington,	Gooch, G.
Development of large ice saws [1976, 14p.] CR 76-47	using remote sensing techniques (1980, p.289-323) MP 1283	Ice jam problems at Oil City, Pennsylvania [1981, 19p.] SR 81-09
Haines-Fairbanks pipeline: design, construction and opera- tion (1977, 20p.) SR 77-04	Historical shoreline changes as determined from serial photointerpretation (1980, p.167-170) MP 1803	Ottauquechee River-analysis of freeze-up processes (1982, p. 2-37.
Permafrost excavating attachment for heavy buildozers	Inlet current measured with Seasat-1 synthetic aperture radar	p.2-37 ₁ MP 1738 Performance of the Allegheny River ice control structure,
(1977, p.144-151) MP 955	[1980, p.35-37] MP 1481	1983 (1984, 15p.) SR 84-13

Construction and calibration of the Ottauquechee River model [1985, 10p.] SR 85-13	Effect of freezing and thawing on the permeability and struc- ture of soil [1979, p.73-92] MP 1225	Surface disturbance and protection during economic development of the North [1981, 88p.] MP 146
Goodman, D.J.	Ultrasonic velocity investigations of crystal anisotropy in deep ice cores from Antarctics [1979, 16p.]	Gray, C. Disinfaction of Prestamentar by microwave -1980 15n a
4th report of working group on testing methods in ice (1984, p.1-41) MP 1886	CR 79-10	Disinfection of wastewater by microwaves [1980, 15p.] SE 88-01
Geodwin, C. Computer simulation of the snowmelt and soil thermal regime	On the origin of stratified debris in ice cores from the bottom of the Antarctic ice sheet [1979, p.185-192]	Greaturex, A. Comparative testing system of the applicability for various
at Barrow, Alaska [1975, p.709-715] MP 857	MP 1272	thermal scanning systems for detecting heat losses in build
Goodwin, C.W.	Ultrasonic velocity investigations of crystal anisotropy in deep ice cores from Antarctica [1979, p.4865-4874]	ings (1978, p.B71-B90) MP 121: Roof moisture survey: Reserve Center Garage, Grenier Field
Potential responses of permafrost to climatic warming [1984, p.92-105] MP 1710	MP 1239	Manchester, N.H. [1981, 18p.] SR 81-31
Gerdon, A.L.	Crystal alignments in the fast ice of Arctic Alaska [1979, 21p.] CR 79-22	Examination of a blistered built-up roof: O'Neill Building Hanscom Air Force Base (1983, 12p.) SR 83-21
Antarctic sea ice microwave signatures and their correlation with in aitu ice observations (1984, p.662-672)	Subsurface measurements of McMurdo Ice Shelf (1979, p.79-80) MP 1338	Can wet roof insulation be dried out (1983, p.626-639)
MP 1668 Gordon, B.E.	Margin of the Greenland ice sheet at Isua [1979, p.155-165]	MP 1505 Comparison of aerial to on-the-roof infrared moisture surveys
Comparative near-millimeter wave propagation properties of	MP 1281	(1983, p.95-105) MP 1709
snow or rain (1983, p.115-129) MP 1690 Attenuation and backscatter for snow and sleet at 96, 140, and	Relationship of ultrasonic velocities to c-axis fabrics and relaxation characteristics of ice cores from Byrd Station,	Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof (1984, 9p. +
225 GHz [1984, p.41-52] MP 1864	Antarctica [1979, p.147-153] MP 1282	figs.; MP 2011
Gordon, R.B.	Crystal alignments in the fast ice of Arctic Alaska (1980, p.1137-1146) MP 1277	Green, G. Wildlife habitat mapping in Lac qui Parle, Minnesota [1984,
Measurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks (1985, p.7827-7836)	Time-priority studies of deep ice cores [1980, p.91-102] MP 1308	p.205-208 ₁ MP 2005
MP 2052 Gould, L.D.	Planetary and extraplanetary event records in polar ice caps	Greenberg, M. Design procedures for underground heat sink systems (1979,
System for mounting end caps on ice specimens 1985,	[1980, p.18-27] MP 1461 Sea ice studies in the Weddell Sea aboard USCGC Polar Sea	186p. in var. pagns.; SE 79-00
p.362-365 ₇ MP 2016 Govoni, J.W.	[1980, p.84-96] MP 1431	Grescher, L.L. Geophysical survey of subglacial geology around the deep
Morphological investigations of first-year sea ice pressure	Ground-truth observations of ice-covered North Slope lakes images by radar g1981, 17p.; CR 81-19	drilling site at Dye 3, Greenland [1985, p.105-110]
ridge sails [1981, p.1-12] MP 1465	Nitrogenous chemical composition of antarctic ice and snow	Grot, R.A. MP 1941
Physical and structural characteristics of sea ice in McMurdo Sound [1981, p.94-95] MP 1542	[1981, p.79-81] MP 1541	Comparative testing system of the applicability for various
Physical and structural characteristics of antarctic sea ice r1982, p.113-117; MP 1548	Physical and structural characteristics of sea ice in McMurdo Sound [1981, p.94-95] MP 1542	thermal scanning systems for detecting heat losses in build- ings [1978, p.B71-B90] MP 1212
[1982, p.113-117] MIP 1548 Baseline water quality measurements at six Corps of Engi-	Physical and structural characteristics of antarctic sea ice [1982, p.113-117] MP 1548	Groves, J.A.
neers reservoirs, Summer 1981 [1982, 55p.] SR \$2-30	Nitrate fluctuations in antarctic snow and firm potential	Analysis of flexible pavement resilient surface deformations using the Chevron isyered elastic analysis computer pro-
Ice growth on Post Pond, 1973-1982 [1983, 25p.] CR 83-04	sources and mechanisms of formation [1982, p.243-248] MP 1551	gram (1975, 13 leaves) MIP 1264
Field measurements of combined icing and wind loads on wires r1983, p.205-215; MP 1637	Brine zone in the McMurdo Ice Shelf, Antarctica [1982,	Gundestrup, N. Ice flow leading to the deep core hole at Dye 3, Greenland
Surface roughness of Ross Sea pack ice [1983, p.123-124]	p.166-171 ₁ MP 1550 Brine zone in the McMurdo Ice Shelf, Antarctica [1982,	[1984, p.185-190] MP 1824
MP 1764	28p. ₁ CR 82-39	Guodong, C. Terrain analysis from space shuttle photographs of Tibe:
Method of detecting voids in rubbled ice [1984, p.183-188] MP 1772	South Pole ice core drilling, 1981-1982 [1982, p.89-91] MP 1621	[1986, p.400-409] MIP 2097
Combined icing and wind loads on a simulated power line test span (1984, 7p.) MP 2114	Ice growth on Post Pond, 1973-1982 (1983, 25p.)	Gaymon, G.L. Galerkin finite element analog of frost heave [1976, p.111-
span (1984, 7p.) MP 2114 Structure of first-year pressure ridge sails in the Prudhoe Bay	CR 83-04	113 ₁ MP 896
region [1984, p.115-135] MIP 1837	Chemical fractionation of brine in the McMurdo Ice Shelf, Antarctica [1983, 16p.] CR 83-06	Mathematical model to predict frost heave [1977, p.92- 109] MP 1131
Comparison of winter climatic data for three New Hampshire aites [1986, 78p.] SR 86-05	Baseline acidity of ancient precipitation from the South Pote 1984, 7p., CR 84-15	Finite element model of transient heat conduction with iso-
Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top	[1984, 7p.] CR 84-15 On small-scale horizontal variations of salinity in first-year	thermal phase change (two and three dimensional) [1977, 167p.] SE 77-34
sites [1986, 6p.] MIP 2107	ses ice [1984, p.6505-6514] MP [761	Frost heave in an instrumented soil column (1980, p.211-
Conductor twisting resistance effects on ice build-up and ice shedding [1986, 8p. + figs.] MP 2108	Crystalline structure of urea ice sheets used in modeling in the CRREL test basin [1984, p.241-253] MP 1838	221 ₁ MP 1331 One-dimensional frost heave model based upon simultaneous
Gow, A.J.	Flexural strengths of freshwater model ice [1984, p.73-82] MP 1826	heat and water flux [1980, p.253-262] MP 1333
Gas inclusions in the Antarctic ice sheet and their glaciological significance (1975, p.5101-5108) MP 847	Quiet freezing of lakes and the concept of orientation textures	Some approaches to modeling phase change in freezing soils [1981, p.137-145] MP 1437
Islands of grounded sea ice [1976, 24p.] CR 76-04	in lake ice sheets (1984, p.137-149) MP 1828	Results from a mathematical model of frost heave (1981, p.2-
Compressibility characteristics of compacted snow 1976, 47p.1 CR 76-21	Crystalline structure of urea ice sheets used in modeling ex- periments in the CRREL test basin 1984, 48p.	6 ₁ MP 1483 Probabilistic-deterministic analysis of one-dimensional ico
Dynamics of near-shore ice [1976, p.9-34] MP 1380	CR 84-24 Sea ice properties :1984, p.82-83; MP 2136	segregation in a freezing soil column [1981, p.127-140] MP 1534
islands of grounded sea ice (1976, p.35-50) MP 987	Laboratory studies of acoustic scattering from the underside	Sensitivity of a front heave model to the method of numerical
Some characteristics of grounded floebergs near Prudhoe Bay, Alaska (1976, 10p.) CR 76-34	of sea ice [1985, p.87-91] MP 1912	simulation [1982, p.1-10] MP 1567
Some characteristics of grounded floebergs near Prudhoe Bay, Alaska [1976, p.169-172] MP 1118	Pressure ridge morphology and physical properties of sea ice in the Greenland Sea [1985, p.214-223] MP 1935	Field tests of a frost-heave model [1983, p.409-414; MP 1657
Rheological implications of the internal structure and crystal	Simulated sea ice used for correlating the electrical properties of the ice with its structural and salinity characteristics	Comparison of two-dimensional domain and boundary inte- gral geothermal models with embankment freeze-thaw field
fabrics of the West Antarctic ice sheet as revealed by deep core drilling at Byrd Station (1976, 25p.) CR 76-35	[1985, p.76-82] MP 1910	data [1983, p.509-513] MP 1659
Rheological implications of the internal structure and crystal	Physical properties of sea ice in the Greenland Sea (1985, p.177-188) MP 1903	Two-dimensional model of coupled heat and moisture trans- port in frost heaving soils [1984, p.91-98] MP 1678
fabrics of the West Antarctic ice sheet as revealed by deep core drilling at Byrd Station (1976, p.1665-1677)	Structure of ice in the central part of the Ross Ice Shelf,	Simple model of ice segregation using an analytic function to
MP 1382	Antarctics (1985, p.39-44) MP 2110 Orientation textures in ice sheets of quietly frozen lakes	model heat and soil-water flow [1984, p.99-104] MP 2164
Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure [1977, 24p.]	[1986, p.247-258] MP 2118	Two-dimensional model of coupled heat and moisture trans-
CR 77-01 Flexural strength of ice on temperate lakes [1977, p.247-	Graham, J.M. Five-year performance of CRREL land treatment test cells;	port in frost-heaving soils [1984, p.336-343] MP 1765
256 ₁ MP 1063	water quality plant yields and nutrient uptake [1978,	Partial verification of a thaw settlement model [1985, p.18- 25] MP 1924
Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. (1977, p.533-546) MP 1066	24p. ₁ SR 78-26 Plant growth on a gravel soil: greenhouse studies (1981, 8p. ₁	25 ₁ MP 1924 Hans, W.M.
Nearshore ice motion near Prudhoe Bay, Alaska (1977, p.23-	SR 81-04	Winter earthwork construction in Upper Michigan 1977,
31; MP 1162 Subsurface measurements of the Ross Ice Shelf, McMurdo	Seasonal growth and uptake of nutrients by orchardgrass irrigated with wastewater [1981, 19p.] CR 81-08	59p. ₃ SR 77-46 Increasing the effectiveness of soil compaction at below-freez
Sound, Antarctica (1977, p.146-148) MP 1013	Seven-year performance of CRREL slow-rate land treatment	ing temperatures [1978, 58p.] SR 78-25
Internal structure of fast ice near Narwahl Island, Beaufort Sea, Alaska [1977, 8p.] CR 77-29	prototypes [1981, 25p.] SR 81-12 Effects of low temperatures on the growth and unfrozen water	Construction of an embankment with frozen soil [1980, 105p.; SR 80-2]
Dielectric constant and reflection coefficient of the snow sur-	content of an aquatic plant [1984, 8p.] CR 84-14	Hals, A.B.
face and near-surface internal layers in the McMurdo Ice Shelf (1977, p.137-138) MP 1011	Grant, C.L. Reverse phase HPLC method for analysis of TNT, RDX,	Cost-effective use of municipal wastewater treatment ponds [1979, p.177-200] MP 1413
Effect of freezing and thawing on the permeability and struc-	HMX and 2,4-DNT in munitions wastewater [1984, 95p.]	Cost of land treatment systems (1979, 135p.) MP 1387
ture of soils [1978, p.31-44] MP 1080 Flexural strength of ice on temperate lakes—comparative	CR 84-29 Reversed-phase high-performance liquid chromatographic	Hall, D.K. 1977 tundra fire in the Kokolik River area of Alaska [1978,
tests of large cantilever and simply supported beams [1978,	determination of nitroorganics in munitions wastewater	
14p. ₇ CR 78-09 Preferred crystal orientations in the fast ice along the margins	[1986, p.170-175] MP 2049 Interlaboratory evaluation of high-performance liquid	p.54-58; MP 1125 1977 tundra fire at Kokolik River, Alaska (1978, 11p.) SR 78-16
of the Arctic Ocean (1978, 24p.) CR 78-13	chromatographic determination of nitroorganics in muni- tion plant wastewater [1986, p.176-182] MP 2050	Landsat digital analysis of the initial recovery of the Kokolii
Ultrasonic measurements on deep ice cores from Antarctica [1978, p.48-50] MP 1292	Grave, N.A.	River tundra fire area, Alaska [1979, 15p.] MP 1636 LANDSAT digital analysis of the initial recovery of burner
Creep rupture at depth in a cold ice sheet [1978, p.733] MP 1168	Physical and thermal disturbance and protection of perma- froat [1979, 42p.] SR 79-05	LANDSAT digital analysis of the initial recovery of bursec tundra at Kokolik River, Alaska [1980, p.263-272] MP 1391
74% 1 1.04	Const Indian Indian Indian	MET EJY

Hammer, C.U. Stable isotope profile through the Ross Ice Shelf at Little	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-	Effect of water content on the compressibility of snow-water mixtures [1979, 26p.] CR 79-62
America V, Antarctica (1977, p.322-325) MP 1095	146 ₃ MP 1673	Turbulent heat transfer in large aspect channels [1979, 5p.]
Hanamete, B.	Hanges, R.K.	CR 79-13
Effect of anow cover on obstacle performance of vehicles (1976, p.121-140) MIP 933	Arctic and Subarctic environmental analyses utilizing ERTS- 1 imagery; bimonthly progress report, 23 June - 23 Aug.	Temperature effect on the uniaxial strength of ice [1979, p.667-681] MP 1231
Development of large ice saws [1976, 14p.] CR 76-47	1972 (1972, 3p.) MP 991	Thermal diffusivity of frozen soil [1980, 30p.]
Lock wall deicing [1977, p.7-14] MP 972	Arctic and subarctic environmental analysis [1972, p.28- 30] MP 1119	SR 89-38 Vibrations caused by ship traffic on an ice-covered waterway
Lock wall deicing studies [1977, 68p.] SR 77-22	Arctic and subarctic environmental analyses using ERTS-1	(1981, 27p.) CR 81-65
Specialized pipeline equipment [1978, 30p.] SR 78-05 Construction equipment problems and procedures: Alaska	imagery. Progress report Dec. 72-June 73 [1973, 75p.] MP 1003	Movement study of the trans-Alaska pipeline at selected sites [1981, 32p.] CR 81-04
pipeline project (1978, 14p.) SR 78-11	Arctic and subarctic environmental analyses utilizing BRTS-	[1981, 32p.] CR 81-04 Dynamic ice-structure interaction analysis for narrow vertical
Deicing a satellite communication antenna (1980, 14p.) SR 50-18	1 imagery [1973, 5p.] MP 1611	structures [1981, p.472-479] MP 1456
Ice control at navigation locks [1981, p.1088-1095]	Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Bimonthly progress report, 23 Aug 23 Oct.	Performance of a point source bubbler under thick ice [1982, p.111-124] MP 1529
MP 1448	1973 [1973, 3p.] MP 1030	Determining the characteristic length of model ice sheets
Application of a block copolymer solution to ice-prone struc- tures (1983, p.155-158) MP 1636	Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Bimonthly progress report, 23 Oct 23 Dec.	[1982, p.99-104] MP 1570
tures [1983, p.155-158] MP 1636 Methods of ice control [1983, p.204-215] MP 1642	1973 [1973, 6p.] MP 1031	Experimental determination of the buckling loads of floating ice sheets [1983, p.260-265] MP 1626
Aerostat icing problems [1983, 29p.] SR 83-23	Arctic and subarctic environmental analysis utilizing ERTS- 1 imagery. Final report June 1972-Feb. 1974 (1974,	Experiments on ice ride-up and pile-up [1983, p.266-270]
Hannel, W.	1 imagery. Final report June 1972-res. 1974 (1974, 128p.) MP 1047	MP 1627 loe forces on model marine structures (1983, p.778-787)
Utilization of sewage sludge for terrain stabilization in cold regions [1977, 45p.] SR 77-37	Selected climatic and soil thermal characteristics of the	MP 1606
Honocom, J.T.	Prudhoe Bay region [1975, p.3-12] MP 1654 Climatic and soil temperature observations at Atkasook on	Measurement of ice forces on structures [1983, p.139-155] MP 1641
Break-up of the Yukon River at the Haul Road Bridge: 1979 [1979, 22p. + Figs.] MP 1315	the Meade River, Alaska, summer 1975 [1976, 25p.]	lce forces on model bridge piers [1983, 11p.] CR 83-19
[1979, 22p. + Figs.] MP 1315 Hansen, B.L.	SR 76-01	Ice force measurements on a bridge pier in the Ottauquechee
C-14 and other isotope studies on natural ice [1972, p.D70-	Remote sensing of land use and water quality relationships— Wisconsin shore, Lake Michigan [1976, 47p.]	River, Vermont [1983, 6p.] CR 83-32
D92 ₁ MP 1052	CR 76-30	Performance of a thermosyphon with an inclined evaporator and vertical condenser [1984, p.64-68] MP 1677
Hansen, G.M. FIRE IN THE NORTHERN ENVIRONMENT-A SYM-	Skylab imagery: Application to reservoir management in New England [1976, 51p.] SR 76-87	and vertical condenser [1984, p.64-68] MP 1677 Observations during BRIMFROST '83 [1984, 36p.] SR 84-10
POSIUM [1971, 275p.] MP 878	Climatic and dendroclimatic indices in the discontinuous per-	SE \$4-10 Laboratory tests and analysis of thermosyphous with inclined
Hardenberg, M.	n afrost zone of the Central Alaskan Uplands [1978, p. 392- 398] MP 1099	evaporator sections [1985, p.31-37] MP 1853
Corps of Engineers land treatment of wastewater research program: an annotated bibliography [1983, 82p.]	Thaw penetration and permafrost conditions associated with	Vibration analysis of the Yamachiche lightpier (1986, p.238-
SR 83-09	the Livengood to Prudhoe Bay road, Alaska (1978, p.615-	241 ₁ MP 1989 Heat transfer characteristics of thermosyphons with inclined
Hare, H.E. Five-year performance of CRREL land treatment test cells;	621 ₁ MP 1102 Landsat data collection platform at Devil Canyon site, upper	evaporator sections [1986, p.285-292] MP 2034
water quality plant yields and nutrient uptake [1978,	Susitna Basin, Alaska—Performance and analysis of data	Helms, J.W.
24p. ₂ SR 78-26	[1979, 17 refs.] SR 79-02 Coastal-inland distributions of summer air temperature and	Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982,
Use of 15N to study nitrogen transformations in land treat- ment [1979, 32p.] SR 79-31	precipitation in northern Alaska [1980, p.403-412]	597p. ₁ SE 82-23
Overland flow: removal of toxic volatile organics [1981,	MP 1439	Hemming, J.E. Workshop on Environmental Protection of Permafrost Ter-
16p. ₁ SR 81-01	Hydrology and climatology of the Caribou-Poker Creeks Research Watershed, Alaska [1982, 34p.] CR 82-26	rain [1980, p.30-36] MP 1314
Seven-year performance of CRREL slow-rate land treatment prototypes (1981, 25p.) SR 81-12	Climate of remote areas in north-central Alaska: 1975-1979	Henry, K.
Harle, J.C.	summary (1982, 110p.) CR 82-35	Introduction to heat tracing [1986, 20p.] TD 86-01 Heavy, K.S.
Relationships between estimated mean annual air and perma-	Relationships between estimated mean annual air and perma- frost temperatures in North-Central Alaska (1983, p.462-	Comparative field testing of buried utility locators [1984,
frost temperatures in North-Central Alaska [1983, p.462-467] MP 1658	467 ₃ MP 1658	25p. ₁ MP 1977
Harr, M.B.	Constraints and approaches in high latitude natural resource sampling and research (1984, p.41-46) MP 2013	Detection of buried utilities. Review of available methods and a comparative field study [1984, 36p.] CR 84-31
Probabilistic-deterministic analysis of one-dimensional ice segregation in a freezing soil column [1981, p.127-140]	Growth and flowering of cottongrass tussocks along a climatic	Herren, M.M.
MP 1534	transect in northcentral Alaska [1984, p.10-11] MP 1950	Vanadium and other elements in Greenland ice cores [1976, 4p.; CR 76-24
Harrington, M.	Hämler, F.U.	4p. ₁ CR 76-24 Seasonal variations of chemical constituents in annual layers
Vapor drive maps of the U.S.A. [1986, 7p. + graphs] MP 2941	4th report of working group on testing methods in ice 1984,	of Greenland deep ice deposits [1977, p.302-306]
Harris, R.W.	p.1-41 ₂ MP 1886 Hawkes, L	MP 1094 Interhemispheric comparison of changes in the composition
Land treatment processes within CAPDET (Computer-assist- ed procedure for the design and evaluation of wastewater	Photoelastic instrumentation-principles and techniques	of atmospheric precipitation during the Late Cenozoic era
treatment systems) [1983, 79p.] SR 83-26	(1979, 153p.) SR 75-13	(1977, p.617-631) MP 1979 Vanadium and other elements in Greenland ice cores (1977,
Harrison, L.P.	Hawkins, L.M.E. Application of removal and control methods. Section 1:	p.98-102 ₁ MP 1692
Report on ice fall from clear sky in Georgia October 26, 1959 [1960, 31p. plus photographs] MP 1017	Railways; Section 2: Highways; Section 3: Airports (1981,	Atmospheric trace metals and sulfate in the Greenland Ice Sheet [1977, p.915-920] MIP 949
Harrison, W.D.	p.671-706 ₁ MP 1447 Hayes, R.	Honer, C.R.
Chemistry of interstitial water from subsets permafrost,	Application of HEC-2 for ice-covered waterways (1982	Application of heat pipes on the Trans-Alaska Pipeline
Prudhoe Bay, Alaska [1978, p.92-98] MP 1385 Harrison, W.L.	p.241-248 ₁ MIP 1575	[1979, 27p.] SR 79-26 Hewaser, C.J.
Shallow snow performance of wheeled vehicles (1976, p.589-	Haynes, D. Ice force measurement on the Yukon River bridge [1981,	Geobotanical studies on the Taku Glacier anomaly [1954,
614 ₁ MP 1130 Proceedings of the International Society for Terrain-Vehicle	p.749-777 ₃ MP 1396	p.224-239 ₁ MP 1215
Systems Workshop on Snow Traction Mechanics, Alta,	Some effects of friction on ice forces against vertical struc- tures (1986, p.528-533) MP 2036	Hister, W.D., III Mesoscale deformation of sea ice from satellite imagery
Utah, Jan. 29-Feb. 2, 1979 [1981, 71p.] SR 81-16	tures [1986, p.528-533] MP 2036 Haynes, F.D.	[1973, 2p.] MIP 1120
Shallow anow test results [1981, p.69-71] MP 1478 Snow measurements in relation to vehicle performance	Ice forces on model structures (1975, p.400-407)	Classification and variation of sea ice ridging in the Arctic basin (1974, p.127-146) MP 1922
(1981, p.13-24) MP 1473	MP 863 Ice forces on simulated structures [1975, p.387-396]	Meso-scale strain measurements on the Beaufourt sea pack
Analysis of vehicle tests and performance predictions (1981,	MP 864	ice (AIDJEX 1971) [1974, p.119-138] MP 1035
p.51-67 ₁ MP 1477 Prediction methods (1981, p.39-46 ₁ MP 1475	Interpretation of the tensile strength of ice under triaxial	Statistical variations in Arctic sea ice ridging and deformation rates (1975, p.J1-J16) MP 850
Field investigations [1981, p.47-48] MP 1476	stress (1976, p.375-387) MP 996 Survey of design criteria for harbors and channels in cold	Measurement of sea ice drift far from shore using LANDSAT
Shallow snow model for predicting vehicle performance	regions—an annotated bibliography (1976, 32p.)	and aerial photographic imagery [1975, p.541-554] MP 849
(1981, 21p.) CR 81-20 Measurement of snow surfaces and tire performance evalua-	CR 76-03 Interpretation of the tensile strength of ice under triaxial	Height variation along sea ice pressure ridges and the proba-
tion (1982, 7p.) MP 1516	stresses [1976, 9p.] CR 76-05	bility of finding "holes" for vehicle crossings [1975, p.191- 199] MP 848
Snowpack profile analysis using extracted thin sections {1982, 15p.; SR 82-11	Effect of temperature on the strength of frozen silt [1977,	Techniques for using LANDSAT imagery without references
(1962, 13p.) Winter tire tests: 1980-81 (1985, p.135-151) MP 2045	27p. ₁ CR 77-03 Haines-Fairbanks pipeline: design, construction and opera-	to study sea ice drift and deformation (1976, p.115-135) MP 1059
	tion (1977, 20p.) SR 77-04	Thickness and roughness variations of arctic multiyear see ice
Heart transfer over a vertical melting plate [1977, 12p.; CR 77-32	Measuring the uniaxial compressive strength of ice (1977, p.213-223) MP 1027	(1976, 25p.) CR 76-18
Hartman, C.W.		20-yr oscillation in eastern North American temperature re- cords [1976, p.484-486] MIP 889
Environmental atles of Alaska [1978, 95p.] MP 1204	Canol Pipeline Project: a historical review (1977, 32p.) SR 77-34	Techniques for studying sea ice drift and deformation at sites
Hassalmana, K.	Effect of temperature and strain rate on the strength of polycrystalline ice [1977, p.107-111] MIP 1127	far from land using LANDSAT imagery [1976, p.595- 609] MP 866
MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 2. A science	Strength and deformation of frozen silt (1978, p.655-661)	Misgivings on isostatic imbalance as a mechanism for sea ice
plan for a summer Marginal Ice Zone Experiment in the Fram Strait/Greenland Ses: 1984 [1983, 47p.]	MP 1165 Effect of temperature on the strength of snow-ice (1978,	cracking (1976, p.85-94) MP 1379 Seasonal variations in apparent sea ice viscosity on the geo-
SR 83-12	25p.; CR 78-27	physical scale [1977, p.87-90] MP 900

Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.533-546] MP 1066	Standardized testing methods for measuring mechanical properties of ice (1981, p.245-254) MP 1856	Hopkins, M.A. Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 85-24
Finite element formulation of a sea ice drift model (1977, p.67-76; MP 1165	Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47]	disks (1985, 17p.) CR 85-26 Herigachi, R.
Modeling pack ice as a viscous-plastic continuum: some preliminary results (1977, p.46-55) MP 1164	MP 1568 Determining the characteristic length of model ice sheets	Role of heat and water transport in frost heaving of fine grained porous media under negligible overburden pressure
Examination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-133]	[1982, p.99-104] MP 1570 Properties of urea-doped ice in the CRREL test basin [1983,	[1984, p.93-102] MP 1842 Role of phase equilibrium in frost heave of fine-grained soi
MP \$63 Model simulation of near shore ice drift, deformation and	44p.; CR 83-68 Experiments on ice ride-up and pile-up (1983, p.266-270)	under negligible overburden pressure (1985, p.50-68) MP 1890
thickness [1978, p.33-44] MP 1010 Measurement of measurale deformation of Beaufort sea ice	MP 1627 Experimental determination of the buckling loads of floating	Hern, D.A.
(AIDJEX-1971) (1978, p.148-172; MP 1179 Some results from a linear-viscous model of the Arctic ice	ice sheets [1983, p.260-265] MP 1626 lee forces on model bridge piers [1983, 11p.] CR 83-19	MIZEX: a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 5: MIZEX 84 summer experiment PI preliminary reports [1984, 176p.]
cover [1979, p.293-304] MP 1241 Dynamic thermodynamic see ice model [1979, p.815-846]	Haatlak, J.	SR 84-29
MP 1247 20-yr cycle in Greenland ice core records [1979, p.481-483]	Destruction of ice islands with explosives [1978, p.753-765] MP 1018	Heasten, B.J. Regulated set concrete for cold weather construction (1980,
MP 1245	Study of several pressure ridges and ice islands in the Canadi- az Beaufort Ses £1978, p.519-532, MP 1187	p.291-314 ₁ MP 1389 Cold weather construction materials; Part 2—Regulated-set
Documentation for a two-level dynamic thermodynamic sea ice model [1980, 35p.] SR 80-06	See ice pressure ridges in the Beaufort See [1978, p.249- 271] MP 1132	cement for cold weather concreting, field validation of laboratory tests [1981, 33p.] MP 1466
Numerical modeling of sea ice in the seasonal sea ice zone (1980, p.299-356) MP 1296	Multi year pressure ridges in the Canadian Beaufort Sea [1979, p.107-126] MP 1229	Houthcold, J.M. Effect of freezing on the level of contaminants in uncontrolled
Nonsteady ice drift in the Strait of Belle Iale t1980, p.177-1861 MP 1364	Multi-year pressure ridges in the Canadian Beaufort Sea [1981, p.125-145] MP 1514	hazardous waste sites. Part 1. Literature review and con- cepts [1985, p.122-129] MP 2021
Ses ice growth, drift, and decay [1980, p.141-209] MIP 1298	He, S.C. Effect of seasonal soil conditions on the reliability of the M15	Hewe, K.E. Hydrology and climatology of the Caribou-Poker Creeks Re-
Modeling a variable thickness sea ice cover (1980, p.1943- 1973) MP 1424	land mine (1984, 35p.; SR 84-18 Hobble, J.E.	acarch Watershed, Alsaka [1982, 34p.] CR 82-24 Hewells, D.H.
MIZEX—a program for mesoscale air-ice-ocean interaction; experiments in Arctic marginal ice zones. 1. Research	Arctic limnology: a review [1973, p.127-168] MIP 1667	Let's consider land treatment, not land disposal [1976, p.60-
strategy [1981, 20p.] SR 81-19 On modeling mesoscale ice dynamics using a viscous plastic	Environmental analyses in the Kootenai River region, Mon- tana 1976, 53p. ₁ SR 76-13	Hromadka, T.V., II
constitutive law [1981, p.1317-1329] MP 1526 Preliminary results of ice modeling in the East Greenland area	Hock, D. Drainage network analysis of a subarctic watershed: Caribou-	Finite element model of transient heat conduction with iso- thermal phase change (two and three dimensional) 1977,
[1981, p.867-878] MP 1458 Modeling pressure ridge buildup on the geophysical scale	Poker Creeks research watershed, interior Alaska (1979, 9p.)	167p.; SR 77-34 One-dimensional frost heave model based upon simultaneous
[1982, p.141-155] MP 1890 On modeling the Weddell Sea pack ice [1982, p.125-130]	Drainage network analysis of a subarctic watershed (1979, p.349-359) MP 1274	heat and water flux [1980, p.253-262] MP 1333 Some approaches to modeling phase change in freezing soils
MP 1349 On modeling seasonal and interannual fluctuations of arctic	Hodek, R.J.	[1981, p.137-145] MIP 1437 Results from a mathematical model of frost heave [1981, p.2-
sea ice (1982, p.1514-1523) MP 1579 Numerical simulation of the Weddell Sea pack ice (1983,	Ice and navigation related sedimentation [1978, p.393-403] MP 1133	6 ₁ MP 1483
p.2873-2887 ₁ MP 1592	Hodge, S.M. Snow and ice [1975, p.435-441, 475-487] MP 844	Probabilistic-deterministic analysis of one-dimensional ice segregation in a freezing soil column (1981, p. 127-140) MP 1534
On forecasting mesoscale ice dynamics and build-up [1983, p.110-115] MP 1625	Heekstra, P. In-situ measurements on the conductivity and surface imped-	Sensitivity of a frost heave model to the method of numerical
MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 2. A science	ance of sea-ice at VLF frequencies [1971, 19p. plus dia- grams] MP 1071	simulation [1982, p.1-10] MP 1567 Comparison of two-dimensional domain and boundary into
plan for a summer Marginal Ice Zone Experiment in the Fram Strait/Greenland Sea: 1984 (1983, 47p.) SR \$3-12	Electrical resistivity profile of permafrost [1974, p.28-34] MP 1045	gral geothermal models with embankment freeze-thaw field data [1983, p.509-513] MP 1639
Marginal ice zones: a description of air-ice-ocean interactive	Electrical ground impedance measurements in Alaskan per- mafrost regions [1975, 60p.] MP 1049	Gata (1983, p.309-513) MP 1689 Field tests of a frost-heave model (1983, p.409-414) MP 1687
processes, models and planned experiments [1984, p.133- 146] MP 1673	Geophysical methods for hydrological investigations in per- mafrost regions [1976, p.75-90] MP 932	Simple model of ice segregation using an analytic function to model heat and soil-water flow (1984, p.99-104)
Large-scale ice/ocean model for the marginal ice zone [1984, p.1-7] MP 1778	Rock, frozen soil and ice breakage by high-frequency electro- magnetic radiation. A review (1976, 17p.) CR 76-36	MP 2104 Two-dimensional model of coupled heat and moisture trans-
Bast Greenland Sea ice variability in large-scale model simulations (1984, p.9-14) MP 1779	Selected examples of radiohm resistivity surveys for geotechnical exploration [1977, 16p.] SR 77-01	port in frost heaving soils (1984, p.91-98) MP 1671 Two-dimensional model of coupled heat and moisture trans-
MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 3. Modeling the	Workshop on Permafrost Geophysics, Golden, Colorado, 23-	port in frost-heaving soils [1984, p.336-343] MP 1765
marginal ice zone (1984, 99p.) SR 84-07 On the role of ice interaction in marginal ice zone dynamics	Hoff, G.C.	Model of 2-dimensional freezing front movement using the complex variable BE method [1985, 9p.] MP 2877
[1984, p.23-29] MP 1781 Mechanism for floe clustering in the marginal ice zone	Cold weather construction materials; Part 2—Regulated-set cement for cold weather concreting, field validation of	Haleo, S.V.
(1984, p.73-76) MP 1785 Ocean circulation: its effect on seasonal sea-ice simulations	iaboratory tests (1981, 33p.) MP 1466 Hogan, A.W.	Inlet current measured with Seasat-1 synthetic aperture radas [1980, p.35-37] MP 1443
[1984, p.489-492] MP 1700 loe dynamics [1984, 52p.] M 84-03	Meteorological variation of atmospheric optical properties in an antarctic storm [1986, p.1155-1165] MP 2999	Inlet current measured with Seasat-I synthetic aperture rada: [1980, p.35-37] MP 1481
Model simulation of 20 years of northern hemisphere sea-ice fluctuations [1984, p.170-176] MP 1767	Hogan, G. Studies of high-speed rotor icing under natural conditions	Huber, N.P. Dynamic friction of bobaled runners on ice r1985, 26p.
Role of sea ice dynamics in modeling CO2 increases (1984, p.238-253) MP 1749	(1983, p.117-123 ₁ MP 1635 Hogne, G.B.	Dynamic friction of bobsled runners on ice [1985, 26p.] MP 2002 Humiston, N.
MIZEX 83 mesoscale sea ice dynamics: initial analysis [1984, p.19-28] MP 1811	Ice forces on vertical piles [1972, p.104-114] MP 1024 Ice forces on vertical piles [1977, 9p.] CR 77-10	Thermal analysis of a shallow utilidor (1986, 10p.)
On the rheology of a broken ice field due to fice collision [1984, p.29-34] MP 1812	Holdsworth, G.	Humiston, N.H.
MIZEX 84 mesoscale sea ice dynamics: post operations report [1984, p.66-69] MP 1257	W-11 - 4 OW	Catalog of Corps of Engineers structure inventories suitable for the acid precipitation-structure material study (1985, 60 to 1985).
Modeling of Arctic sea ice characteristics relevant to naval	South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1621	40p.) SR 85-01 Humphreys, D.H.
Numerical modeling of sea ice dynamics and ice thickness	Holt, B. Science program for an imaging radar receiving station in	Ice resistance tests on two models of the WTGB icebreaker [1984, p.627-638] MP 1716
characteristics. A final report r1985, 50p.; CR 85-05	Aštaka (1983, 45p.) MP 1884 Holt, E.T.	Hunter, J.A. Geophysics in the study of permafrost [1979, p.93-115] MP 1264
Numerical simulation of Northern Hemisphere sea ice variability, 1951-1980 (1985, p.4847-4865) MP 1882	Surface roughness of Ross Sea pack ice [1983, p.123-124] MP 1764	MP 1264 Burloy, J.P.
Modeling sea-ice dynamics (1985, p.549-579) MP 2001 Role of plastic ice interaction in marginal ice zone dynamics	Ses ice data buoys in the Weddell Sea [1984, 18p.] CR 84-11	Vanadium and other elements in Greenland ice cores (1976, 4p.)
(1985, p.11,899-11,909) MP 1544 Hicks, J.R.	Hooke, R.L. Mechanical properties of polycrystalline ice: an assessment of	Vanadium and other elements in Greenland ice cores [1977,
Propene dispenser for cold fog dissipation system [1973,	current knowledge and priorities for research [1979, 16p.] MP 1207	1.98-102) MP 1892 Hutchine, D.R.
38p. ₁ MP 1033 Compressed air seeding of supercooled fog [1976, 9p. ₁ SR 76-09	Mechanical properties of polycrystalline ice: an assessment of current knowledge and priorities for research (1980, p.263-	Comparative near-millimeter wave propagation properties of snow or rain [1983, p.115-129] MP 1690
Use of compressed air for supercooled fog dispersal (1976, p.1226-1231) MP 1614	275) MP 1328 Hopkins, D.M.	Attenuation and backscatter for snow and sleet at 96, 140, and 225 GHz (1984, p.41-52) MP 1864
Laboratory studies of compressed air seeding of supercooled fog (1977, 19p.) SR 77-12	Buried valleys as a possible determinant of the distribution of deeply buried permafrost on the continental shelf of the	Hutt, M. Mobility bibliography [1981, 313p.] SR 41-25
Hirayana, K. Investigation of ice forces on vertical structures [1974,	Beautort See [1979, p. 135-141] MP 1288 Subsea permafrost distribution on the Alaskan shelf [1984,	Hutten, M.S. Analysis of potential ice jam sites on the Connecticut River
153p. ₁ MP 1041	p.75-82 ₁ MP 1852	at Windsor, Vermont r1976, 31p., CR 76-31

Ingersoll, J.	Evaluation of existing systems for land treatment of wastewa-	Bffect of freezing on the level of contaminants in uncontrolled
Development of a remote-reading tensiometer/transducer	ter at Manteca, California, and Quincy, Washington [1977,	hazardous waste sites. Part 1. Literature review and con-
system for use in subfreezing temperatures [1976, p.31-45] MP 897	34p. ₁ CR 77-24 Delineation and engineering characteristics of permafrost	cepts [1985, p.122-129] MP 2028 Ion and moisture migration and frost heave in freezing Morin
Projected thermal and load-associated distress in pavements	beneath the Beaufort Sea [1977, p.432-440] MP 1077	clay [1986, p.1014] MP 1970
incorporating different grades of asphalt cement [1978,	Wastewater treatment alternative needed [1977, p.82-87]	ISTVS Workshop on Measurement and Evaluation of Tire
p.403-437 ₁ MP 1209	MP 968 Delineation and engineering characteristics of permafrost	Performance under Winter Conditions, Alta, Utah, Apr. 11- 14, 1983
Documentation of soil characteristics and climatology during five years of wastewater application to CRREL test cells	beneath the Beaufort Sea [1977, p.518-521] MP 1291	Proceedings of the ISTVS Workshop on Measurement and
[1979, 82p.] SR 79-23	Distribution and properties of road dust and its potential im-	Evaluation of Tire Performance under Winter Conditions,
Asphalt concrete for cold regions; a comparative laboratory	pact on tundra along the northern portion of the Yukon River-Prudhoe Bay Haul Road. Chemical composition of	Alta, Utah, 11-14, April 1983 _[1985, 177p.] SR 85-15
study and analysis of mixtures containing soft and hard grades of asphalt cement [1980, 55p.] CR 80-65	dust and vegetation [1978, p.110-111] MP 1116	Itagaki, K.
Frost heave in an instrumented soil column [1980, p.211-	Soil lysimeters for validating models of wastewater renovation	Improved millivolt-temperature conversion tables for copper
221 ₁ MP 1331	by land application (1978, 11p.) SR 78-12	constantan thermocouples. 32F reference temperature
Infiltration characteristics of soils at Apple Valley, Minn.;	Chemistry of interstitial water from subsea permafrost, Prudhoe Bay, Alaska [1978, p.92-98] MP 1385	[1976, 66p.] SR 76-18
Clarence Cannon Dam, Mo; and Deer Creek Lake, Ohio, land treatment sites [1980, 41p.] SR 88-36	Prudhoe Bay, Alaska [1978, p.92-98] MP 1385 Simulation of the movement of conservative chemicals in soil	Mass transfer along ice surfaces observed by a groove relaxa- tion technique [1977, p.34-37] MP 1091
Method for coincidentally determining soil hydraulic conduc-	solution [1978, p.371-380] MP 1156	De-icing of radomes and lock walls using pneumatic devices
tivity and moisture retention characteristics [1981, 11p.]	Evaluation of N models for prediction of No3-N in percolate	[1977, p.467-478] MP 1064
SR 81-02	water in land treatment [1978, p.163-169] MP 1148	Abnormal internal friction peaks in single-crystal ice [1977,
Laboratory and field use of soil tensiometers above and below	Nitrogen behavior in land treatment of wastewater: a simpli- fied model (1978, p.171-179) MIP 1149	15p. ₁ SR 77-23 Laboratory experiments on lock wall deicing using pneumatic
0 deg C [1981, 17p.] SR 81-07 Simulating frost action by using an instrumented soil column	Overview of existing land treatment systems [1978, p.193-	devices [1977, p.53-68] MP 974
[1981, p.34-42] MP 1485	200 ₃ MIP 1150	Icing on ships and stationary structures under maritime condi-
Hydraulic properties of selected soils [1985, p.26-35]	Geochemistry of subsea permafrost at Prudhoe Bay, Alaska [1978, 70p.] SR 78-14	tions—a preliminary literature survey of Japanese sources
MP 1925	[1978, 70p.] SR 78-14 Effect of waste water reuse in cold regions on land treatment	[1977, 22p.] SR 77-27
Partial verification of a thaw settlement model [1985, p.18- 25] MP 1924	systems [1978, p.361-368] MP 1144	Dielectric properties of dislocation-free ice [1978, p.207- 217] MP 1171
25) MP 1924 Ingersoll, J.W.	Construction and performance of platinum probes for meas-	Charged dislocation in ice: 1. Existence and charge density
Investigation of transient processes in an advancing zone of	urement of redox potential [1978, 8p.] SR 78-27	measurement by X-ray topography [1978, 12p.] CR 79-25
freezing [1983, p.821-825] MP 1663	Computer file for existing land application of wastewater sys- tems: a user's guide [1978, 24p.] SR 78-22	Laboratory experiments on icing of rotating blades (1979,
International Biological Programme. Tundra Biome	Evaluation of nitrification inhibitors in cold regions land	p.85-92 ₁ MP 1236
Proceedings 1972 Tundra Biome symposium [1972, 211p.] MP 1374	treatment of wastewater: Part 1. Nitrapyrin [1979, 25p.]	Practure behavior of ice in Charpy impact testing [1980,
Mr 1374 International Offshore Mechanics and Arctic Engineering	SR 79-18	13p. ₁ CR 80-13
(OMAE) Symposium, 5th, Tokyo, Apr. 13-18, 1986	Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska (1979, p.207-	Charged dislocation in ice. 2. Contribution of dielectric relaxation [1982, 15p.; CR 82-67
Proceedings [1986, 4 vols.] MP 2031	213 ₁ MP 1591	relaxation (1982, 15p.) CR 82-67 Experimental investigation of potential icing of the space
International Offshore Mechanics and Arctic Engineering	Selected design parameters of existing systems for land ap-	shuttle external tank [1982, 305p.] CR 82-25
Symposium, 2nd, Houston, Texas, Jan. 30-Feb. 3, 1963 Proceedings (1983, 813p.) MP 1581	plication of liquid waste—a computer file (1979, p.65-88) MP 1415	Adhesion of ice to polymers and other surfaces [1983, p.241-
Proceedings [1983, 813p.] MP 1581 International Offshore Mechanics and Arctic Engineering	Documentation of soil characteristics and climatology during	252 ₃ MP 1580
Symposium, 3rd, New Orleans, Louisians, Feb. 12-17, 1984	five years of wastewater application to CRREL test cells	Studies of high-speed rotor icing under natural conditions [1983, p.117-123] MP 1635
Proceedings [1984, 3 vois.] MP 1675	[1979, 82p.] SR 79-23	Implications of surface energy in ice adhesion (1983, p.41-
International Offshore Mechanics and Arctic Engineering	Use of 15N to study nitrogen transformations in land treat- ment [1979, 32p.] SR 79-31	48 ₁ MP 1672
Symposium, 4th, Dalles, Texas, Feb. 17-21, 1985	Improved enzyme kinetic model for nitrification in soils	Self-shedding of accreted ice from high-speed rotors (1983,
Proceedings (1985, 2 vols.) MP 2105 International Symposium on the State of Knowledge in	amended with ammonium. 1. Literature review [1980,	p.1-6 ₁ MP 1719
Land Treatment of Wastewater, Aug. 20-25, 1978, Hanover,	20p. _j CR 80-01	Effect of X-ray irradiation on internal friction and dielectric relaxation of ice (1983, p.4314-4317) MP 1670
New Hampshire	Disinfection of wastewater by microwaves [1980, 15p.] SR 80-01	Mechanical ice release processes. 1. Self-shedding from
State of knowledge on land treatment of wastewater (1978, 2 vols.) MP 1145	Simplified model for prediction of nitrogen behavior in land	high-speed rotors [1983, 8p.] CR 83-26
2 vols. ₁ MP 1145 International Workshop/Symposium on Ice Drilling	treatment of wastewater [1, 80, 49p.] CR 80-12	Possibility of anomalous relaxation due to the charged dislo- cation process [1983, p.4261-4264] MP 1669
Technology, 2nd, Calgary, Alberta, Aug. 30-31, 1982	Dynamics of NH4 and NO3 in cropped soils irrigated with wastewater r1980, 20p.; SR 80-27	cation process [1983, p.4261-4264] MP 1669 Icing rate on stationary structures under marine conditions
Ice drilling technology [1984, 142p.] SR 84-34	wastewater [1980, 20p.] SR 80-27 Effectiveness of land application for phosphorus removal	[1984, 9p.] CR 84-12
Irish, R.	from municipal waste water at Manteca, California [1980,	Polyethylene glycol as an ice control coating [1984, 11p.]
Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535-	p.616-621 ₁ MP 1444	CR 84-28
550 ₁ MP 1695	Modeling nitrogen transport and transformations in soils: 1. Theoretical considerations [1981, p.233-241]	lce accretion under natural and laboratory conditions [1985, p.225-228] MP 2009
Irwin, D.	MP 1440	
Corps of Engineers land treatment of wastewater research	Modeling nitrogen transport and transformations in soils: 2.	Dynamic friction of bobsled runners on ice (1985, 26p.) MP 2082
program: an annotated bibliography [1983, 82p.] SR 83-69	Validation [1981, p.303-312] MP 1441	Jackson, L.
Irwia, G.S.	Soil microbiology [1981, p.38-44] MP 1753 Limnological investigations: Lake Koocanusa, Montans. Pt.	Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] SR 84-65
Analysis of vehicle tests and performance predictions (1981,	5: Phosphorus chemistry of sediments (1981, 9p.)	Jackson, T.J.
p.51-67 ₁ MP 1477	SR 81-15	Survey of methods for soil moisture determination [1979,
Irwin, L.H.	Evaluation of a compartmental model for prediction of ni- trate leaching losses (1981, 24n). CR 81-23	74p. ₁ MP 1639
Effect of freezing and thawing on resilient modulus of a granu- lar soil exhibiting nonlinear behavior [1981, p.19-26]	trate leaching losses [1981, 24p.] CR 81-23 Effect of soil temperature and pH on nitrification kinetics in	Jacobs, S.S.
MP 1484	soils receiving a low level of ammonium enrichment [1981,	Structure of ice in the central part of the Ross Ice Shelf, Antarctica (1985, p.39-44) MP 2110
Isaacs, R.M.	27p. ₁ SR 81-33	Jacobson, S.
Designing for frost heave conditions [1984, p.22-44]	Overview of models used in land treatment of wastewater [1982, 27p.] SR 82-01	Preliminary investigations of the kinetics of nitrogen transfor-
MP 1705	Evaluation of a simple model for predicting phosphorus re-	mation and nitrosamine formation in land treatment of was-
Iskandar, A. Delineation and engineering characteristics of permafrost	moval by soils during land treatment of wastewater [1982,	tewater [1979, 59p.] SR 79-04 Jain, A.
beneath the Beaufort Sea [1976, p.391-408] MP 1377	12p. ₁ SR 82-14	Inlet current measured with Seasat-1 synthetic aperture radar
Delineation and engineering characteristics of permafrost	User's index to CRREL land treatment computer programs and data files [1982, 65p.] SR 82-26	[1980, p.35-37] MP 1481
beneath the Beaufort Sea (1976, p.53-60) MP 919	Corps of Engineers land treatment of wastewater research	Inlet current measured with Seasat-1 synthetic aperture radar
Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1977, p.234-237) MP 927	program: an annotated bibliography [1983, 82p.]	[1980, p.35-37] MP 1443
Iskander, I.K.	SR 83-09	Jellinek, H.H.G. Ice removal from the walls of navigation locks [1976, p.1487-
Land treatment of wastewater-case studies of existing dis-	Optimization model for land treatment planning, design and operation. Part 1. Background and literature review [1983,	1496 ₁ MP 888
posal systems at Quincy, Washington and Manteca, Cali-	35p. ₁ SIR 83-06	Ice releasing block-copolymer coatings [1978, p.544-551]
fornia [1976, 36p.] MP 920 Wastewater reuse at Livermore, California [1976, p.511-	Optimization model for land treatment planning, design and	MP 1141
531; MP 870	operation. Part 2. Case study [1983, 30p.] SR 83-07 Mathematical simulation of nitrogen interactions in soils	Jenkina, T.F. Continuous monitoring of total dissolved gases, a feasibility
Wastewater renovation by a prototype slow infiltration land	[1983, p.241-248] MP 2051	study (1975, p.101-105) MP 851
treatment system [1976, 44p.] CR 76-19	Land treatment research and development program: synthesis	Effect of sediment organic matter on migration of various
Reclamation of wastewater by application on land [1976, 15p.] MP 896	of research results (1983, 144p.) CR 83-20	chemical constituents during disposal of dredged material
Urban waste as a source of heavy metals in land treatment	WASTEN: a model for nitrogen behaviour in soils irrigated with liquid waste [1984, p.96-108] MP 1762	[1976, 183p.] MP 967 Wastewater renovation by a prototype slow infiltration land
[1976, p.417-432] MP 977	Impact of dredging on water quality at Kewaunee Harbor,	treatment system [1976, 44p.] CR 76-19
Delineation and engineering characteristics of permafrost	Wisconsin (1984, 16p.) CR 84-21	Fate and effects of crude oil spilled on permafrost terrain.
beneath the Beaufort Sea [1977, p.385-395] MP 1074	User's guide for the BIBSORT program for the IBM-PC per-	First year progress report [1976, 18p.] SR 76-15
Preliminary evaluation of 88 years rapid infiltration of raw municipal sewage at Calumet, Michigan (1977, p.489-	sonal computer [1985, 61p.] SR 85-04 Potential use of artificial ground freezing for contaminant	Composition of vapors evolved from military TNT as in- fluenced by temperature, solid composition, age and source
510 ₁ MP 976	immobilization [1985, 10p.] MP 2029	(1977, 25p.) SR 77-16
Wastewater reuse at Livermore, California (1977, p.511-	Becommics of ground freezing for management of uncon- trolled hazardous wester sizes 1985, 15n MP 2030	Wastewater treatment alternative needed [1977, p.82-87]

Fate and effects of crude oil spilled on permafrost terrain.		
Second annual progress report, June 1976 to July 1977	Reversed-phase high-performance liquid chromatographic determination of nitroorganics in munitions wastewater	Fate and effects of crude oil spilled on permafrost terrain. First year progress report [1976, 18p.] SR 76-15
(1977, 46p.) SR 77-44	[1986, p.170-175] MP 2049	Revegetation and erosion control observations along the
Methodology for nitrogen isotope analysis at CRREL 1978, 57p. ₁ SE 78-08	Jewell, W.	Trans-Alasks Pipeline—1975 summer construction season [1977, 36p.] SR 77-06
Performance of overland flow land treatment in cold climates	Engineering assessment of aquaculture systems for wastewa- ter treatment: an overview [1980, p.1-12] MP 1423	Fate and effects of crude oil spilled on permafrost terrain.
[1978, p.61-70] MP 1152	Jezek, E.C.	Second annual progress report, June 1976 to July 1977 [1977, 46p.] SR 77-44
Physical, chemical and biological effects of crude oil spills on black spruce forest, interior Alaska [1978, p.305-323]	Measurements of radar wave speeds in polar glaciers using a down-hole radar target technique [1983, p.199-208]	1977 tundra fire in the Kokolik River area of Alaska [1978,
MP 1185	MP 2057	p.54-58 ₁ MP 1125
Fate of crude and refined oils in North Slope soils [1978, p.339-347] MP 1186	Recent changes in the dynamic condition of the Ross Ice Shelf, Antarctica (1984, p.409-416) MP 2058	Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska [1978, p.460-466]
Five-year performance of CRREL land treatment test cells;	Modified theory of bottom crevasses used as a means for	MP 1100
water quality plant yields and nutrient uptake [1978, 24p.] SR 78-26	measuring the buttressing effect of ice shelves on inland ice sheets [1984, p.1925-1931] MP 2059	1977 tundra fire at Kokolik River, Alaska [1978, 11p.] SR 78-10
International and national developments in land treatment of	Calculating borehole geometry from standard measurements	Effects of winter military operations on cold regions terrain
wastewater [1979, 28p.] MP 1420 Use of 15N to study nitrogen transformations in land treat-	of borehole inclinometry (1984, 18p.) SR 84-15 Ice flow leading to the deep core hole at Dve 3, Greenland	[1978, 34p.] SR 78-17 Physical, chemical and biological effects of crude oil spills on
ment [1979, 32p.] SR 79-31	[1984, p.185-190] MP 1824	black spruce forest, interior Alaska [1978, p.305-323]
Land application of wastewater: effect on soil and plant potas- aium (1979, p.309-312) MP 1228	Reconsideration of the mass balance of a portion of the Ross	MP 1185 Fate and effects of crude oil spilled on subarctic permafrost
Pilot scale study of overland flow land treatment in cold cli-	Ice Shelf, Antarctica (1984, p.381-384) MP 1919 Discrete reflections from thin layers of anow and ice (1984,	terrain in interior Alaska [1980, 128p.] MP 1310
mates (1979, p.207-214) MP 1279	p.323-331 ₁ MIP 1871	LANDSAT digital analysis of the initial recovery of burned tundra at Kokolik River, Alaska [1980, p.263-272]
Prototype overland flow test data: June 1977-May 1978 [1979, 91p.] SR 79-35	Radar measurements of borehole geometry on the Greenland and Antarctic ice sheets [1985, p.242-251] MP 1817	MP 1391
Wastewater treatment in cold regions by overland flow	Rheology of glacier ice [1985, p.1335-1337] MP 1844	Revegetation and restoration investigations [1980, p.129- 150] MP 1353
[1980, 14p.] CR 80-07 Removal of volatile trace organics from wastewater by over-	Geophysical survey of subglacial geology around the deep- drilling site at Dye 3, Greenland [1985, p.105-110]	Fate and effects of crude oil spilled on subarctic permafrost
land flow land treatment (1980, p.211-224) MP 1313	MP 1941	terrain in interior Alaska [1980, 67p.] CR 80-29
Pate and effects of crude oil spilled on subarctic permafrost terrain in interior Alaska [1980, 128p.] MP 1310	Laboratory studies of acoustic scattering from the underside of sea ice r1985, p.87-911 MP 1912	Chena River Lakes Project revegetation study—three-year summary [1981, 59p.] CR 81-18
Forage grass growth on overland flow systems (1980, p.347-	of sea ice [1985, p.87-91] MP 1912 Johnnessen, O.M.	Johnson, P.
354 ₂ MP 1402 Rational design of overland flow systems (1980, p.114-121 ₁	MIZEX-a program for mesoscale air-ice-ocean interaction;	Proceedings of the Second International Symposium on Cold Regions Engineering [1977, 597p.] MIP 952
MP 1400	experiments in Arctic marginal ice zones. 1. Research strategy (1981, 20p.) SR 81-19	Yukon River breakup 1976 [1977, p.592-596] MIP 960
Removal of organics by overland flow [1980, 9p.] MP 1362	MIZEX—a program for mesoscale air-ice-ocean interaction	Details behind a typical Alaskan pile foundation [1978, p.891-897] MP 1109
Fate and effects of crude oil spilled on subarctic permafrost	experiments in Arctic marginal ice zones. 2. A science plan for a summer Marginal Ice Zone Experiment in the	Johnson, P.L.
terrain in interior Alaska [1980, 67p.] CR 80-29	Fram Strait/Greenland Sea: 1984 [1983, 47p.]	Vegetative research in arctic Alaska [1973, p.169-198]
Overland flow: removal of toxic volatile organics [1981, 16p.] SR 81-01	Marginal ice zones: a description of air-ice-ocean interactive	Johnson, P.R.
Toxic volatile organics removal by overland flow land treat-	processes, models and planned experiments [1984, p.133-	Defensive works of subarctic snow [1977, 23p.]
ment [1981, 14p.] MP 1421 Winter air pollution at Fairbanks, Alsaka [1981, p.512-528]	1461 MP 1673 MIZEX: a program for mesoscale air-ice-ocean interaction	CR 77-06 Measuring unmetered steam use with a condensate pump
MP 1395	experiments in Arctic marginal ice zones. 5: MIZEX 84	cycle counter [1977, p.434-442] MP 957
Seven-year performance of CRREL slow-rate land treatment prototypes (1981, 25p.) SR \$1-12	summer experiment PI preliminary reports [1984, 176p.] SR 84-29	Role of research in developing surface protection measures
Wastewater treatment by a prototype slow rate land treatment	Johansen, N.I.	for the Arctic Slope of Alaska [1978, p.202-205] MP 1968
system [1981, 44p.] CR 81-14	Sublimation and its control in the CRREL permafrost tunnel [1981, 12p.] SR 81-08	Role of research in developing surface protection measures
Development of a rational design procedure for overland flow systems [1982, 29p.] CR 82-02	Johnson, S.J.	for the Arctic Slope of Alaska (1978, p.202-205) MP 1519
Vegetation selection and management for overland flow sys- tems [1982, p.135-154] MP 1511	Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22]	Ground pressures exerted by underground explosions [1978, p.284-290] MP 1520
Relationship between the ice and unfrozen water phases in	MP 998	p.284-290 ₁ MP 1520 Environmental atlas of Alaska [1978, 95p.] MP 1204
frozen soil as determined by pulsed nuclear magnetic reso- nance and physical desorption data (1982, 8p.)	Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] MP 997	Ice forces on the Yukon River bridge—1978 breakup [1979,
CR 82-15		40p. ₁ MIP 1304
Mobility of water in farmer soils -1002 alfo.	Stable isotope profile through the Ross Ice Shelf at Little	
Mobility of water in frozen soils [1982, c15p.]	America V, Antarctica (1977, p.322-325) MP 1095	Snow and ice roads in the Arctic [1979, p.1063-1071] MIP 1223
MP 2012 Method for measuring enriched levels of deuterium in soil	America V, Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1245	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice
MP 2012 Method for measuring enriched levels of deuterium in soil water (1982, 12p.) SR 82-25	America V, Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1245 Johnson, A.J.	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980,
MP 2012 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1245 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alsaka pipeline, 1975-1978 (1981, 1159.)	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alaska [1980, 12p.] CR 80-11
Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] MP 1629	America V, Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1245 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alsaka pipeline, 1975-1978 (1981, 115p.) CR 81-12	Snow and ice roads in the Arctic [1979, p.1063-1071]. MP 1223 Ice thickness-tensile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.) CR 80-17
MP 2012 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions	America V, Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1245 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W.	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.] Single and double reaction beam load cells for measuring ice
Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Baseline water quality measurements at six Corpa of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-36 Assessment of the treatability of toxic organics by overland	America V, Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1245 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska [1978]	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.] CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982,
MP 2012 Method for measuring enriched levels of deuterium in 2012 Water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR 82-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) Relationship between the ice and unfrozen water phases in	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 ex-	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.] CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982, p.111-124] MP 1529
Method for measuring enriched levels of deuterium in soil water [1982, 12p.] SR 82-23 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] MP 1629 Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-30 Assessment of the treatability of toxic organics by overland flow [1983, 47p.] Relationship between the ice and unfrozen were phases in frozen soils as determined by pulsed nuclear resonance and	America V, Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p. 481-483, MP 1245 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and addi-	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.) CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] CR 80-25, p.111-124, MP 1529 Jehnson, R. Cements for structural concrete in cold regions [1977, 13p.]
MP 2012 Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) Assessment of the treatability of toxic organics by overland flow (1983, 47p.) Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska [1978, 81p.) CR 78-28 Reconnaissance observations of long-term natural vegetation	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.] CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performed of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Johnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35
Method for measuring enriched levels of deuterium in soil water [1982, 12p.] SR 82-23 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-30 Assessment of the treatability of toxic organics by overland flow [1983, 47p.] Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983,	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1245 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.) CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] CR 80-25, p.111-124, MP 1529 Jehnson, R. Cements for structural concrete in cold regions [1977, 13p.]
Method for measuring enriched levels of deuterium in soil water [1982, 12p.] SR 82-25 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] MP 1629 Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-30 Assessment of the treatability of toxic organics by overland flow [1983, 47p.] Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1631 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Soil-water diffusivity of unsaturated frozen soils at subzero	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1245 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska [1978, 81p.) CR 78-28 Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora [1985, 75p.] CR 85-11 Johnson, J.B.	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.] CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Johnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature search [1977, 49p.] SR 77-42 Grouting silt and sand at low temperatures—a laboratory
Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-30 Assessment of the treatability of toxic organics by overland flow [1983, 47p.] Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] MP 1664	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1245 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska, [1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Jehasoa, R. Cements for structural concrete in cold regions [1977, 13p., 38 77-35] Grouting of soils in cold environments: a literature search (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation (1979, 33p.)
MP 2012 Method for measuring enriched levels of deuterium in 301 water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-30 Assessment of the treatability of toxic organics by overland flow [1983, 47p.] Relationship between the ice and unfrozen water plasses in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) CR 78-28 Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.] CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick cel [1982, p.111-124] MP 1529 Jehnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature search [1977, 49p.] Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.] Grouting silt and sand at low temperatures [1979, p.937, 950] MP 1078
Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corpor of Engineers reservoirs, Summer 1981 (1982, 55p.) SR 82-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p. 37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions 1983, p. 15-26, MP 1601 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p. 889-893) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, p.) CR 83-22	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checkinst of flora (1985, 75p.) CR 83-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.42-47) MP 1920	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982, p.111-124] Johnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature series (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.] Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold
Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-30 Assessment of the treatability of toxic organics by overland flow [1983, 47p.] Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] MP 1664 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, 8p.] Impact of dredging on water quality at Kewaunee Harbor, Wisconsin [1984, 16p.] CR 84-21	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alsaka pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alsaka [1978, 81p.) CR 78-28 Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alsaka, and additions to the checklist of flora (1985, 75p.) CR 85-13 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements [1983, p.124-128] MP 2056 Stress measurements in ice [1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debria as compared to persons on the overtying surface [1984, p.42-47] In-ice calibration tests for an elongated, uniaxial brass ice	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice (1980, 11p.) Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.) Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.) CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.) Performance of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Johnson, R Cements for structural concrete in cold regions [1977, 13p.) SR 77-35 Grouting of soils in cold environments: a literature search (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.) Grouting silt and sand at low temperatures [1979, p.937. 950] Resins and non-portland cements for construction in the cold (1980, 19p.) Johnson, T.C.
Method for measuring enriched levels of deuterium in 201 water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR \$2-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, [1983, p.15-26] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1664 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, 8p.) CR 83-22 Impact of dredging on water quality at Kewaunee Harbor, Wisconsin (1984, 16p.) Transport of water in frozen soil: 5, Method for measuring the	America V. Ántarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 83-13 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128, MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.424-47) In-ice calibration tests for an elongated, uniaxial brass ice stress sensor (1985, p.244-249) MP 1859 Prost heave forces on piling (1985, 2p.) MP 1732	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. construction, use and breakup [1980, 28p.) CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982, p.111-124] Johnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature and sorted (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.] Grouting silt and sand at low temperatures [1979, p.937-950] Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) Johnson, T.C. Resilient modulus and Poisson's ratio for frozen and thawed
Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR 82-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p. 37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, 1983, p.15-26, Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1661 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, p.1) Transport of water in frozen soil. 2. Experimental determination of soil-water diffusivity under isothermal conditions (1983, p.) Transport of water in frozen soil. 5. Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179). MP 1819	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska [1978, 81p.) CR 78-28 Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements [1983, p.124-128] MP 2056 Stress measurements in ice [1983, 31p.) Preferential detection of sound by persons buried under anow avalanche debria as compared to persons on the overlying surface [1984, p.42-47] In-ice calibration tests for an elongated, uniaxial brass ice stress sensor (1985, p.244-249) Frost heave forces on piling [1985, 2p.) MP 1859 Frost heave forces on piling [1985, 2p.) MP 1732 Audibility within and outside deposited snow [1985, p.136-	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982, p.111-124] Jehnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature search (1977, 49p.] Grouting silt and sand at low temperatures—a laboratory investigation (1979, 33p.) Grouting silt and sand at low temperatures [1979, p.937-950] Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) SR 80-35 Johnson, T.C. Resilient modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials (1977, p.229-281) MP 1724
Method for measuring enriched levels of deuterium in soli water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR \$2.30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, 1983, p.15-26 Soil-water diffusivity of unasturated frozen soils at subzero temperatures (1983, p.889-893) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, 8p.) CR \$3-22 Impact of dredging on water quality at Kewaunce Harbor, Wisconsin (1984, 16p.) Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179) Impact of slow-rate land treatment on groundwater quality:	America V. Ántarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 83-13 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.424-47) In-ice calibration tests for an elongated, uniaxial brass ice stress sensor (1985, p.244-249) In-ice calibration tests for an elongated, uniaxial brass ice stress sensor (1985, p.24-249) Prost leave forces on piling (1985, 2p.) MP 1932 Audibility within and outside deposited snow (1985, p.136-142) Frost jacking forces on H and pipe piles embedded in Fair-	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice (1980, 11p.) Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.) Snow pads used for pipeline construction in Alsaka, 1976. CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.) Experiormance of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Jehnson, R. Cements for structural concrete in cold regions [1977, 13p.) SR 77-35 Grouting of soils in cold environments: a literature search [1977, 49p.] Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.] Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) SR 80-35 Jehnson, T.C. Resiline and clay subgrade materials [1977, p.229-281] MP 1724 Effect of freeze-thaw cycles on resilient properties of fine-
Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR 82-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, 1983, p.15-26 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1661 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1601 Soil-water diffusivity under isothermal conditions (1983, 8p.) CR 83-22 Impact of dredging on water quality at Kewaunee Harbor, Wisconsin (1984, 16p.) CR 84-21 Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179) MP 1819 Impact of slow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) Reverse phase HPLC method for analysis of TNT, RDX,	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483, MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.42-47) In-ice calibration tests for an elongated, uniaxial brasic integral sensor (1985, p.244-249) MP 1930 Audibility within and outside deposited snow (1985, p.136-142) Frost jacking forces on H and pipe piles embedded in Fairbanka silt (1985, p.125-133) MP 1930 MP 1930	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. CR 89-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982, p.111-124] Johnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature search (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.] Grouting silt and sand at low temperatures [1979, p.937-950] Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) Johnson, T.C. Resilient modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials [1977, p.229-281]. MP 1078 Biffect of freeze-thaw cycles on resilient properties of fine-grained soils (1978, 19p.) Influence of freezing and thawing on the resilient properties
Method for measuring enriched levels of deuterium in 2012 water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR \$2-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, (1983, p.15-26) MP 1601 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, 8p.) CR 83-22 Impact of dredging on water quality at Kewaunce Harbor, Wisconsin (1984, 16p.) Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179) Impact of slow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) Reverse phase HPLC method for analysis of TNT, RDX, HMX and 2,4-DNT in munitions wastewater (1984, 95p.)	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 83-13 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.42-47) In-ice calibration tests for an elongated, uniaxial brass ice stress sensor (1985, p.244-249) MP 1920 In-ice validation tests for an elongated, uniaxial brass ice stress sensor (1985, p.244-249) MP 1930 Audibility within and outside deposited snow (1985, p.136-104) Froet jacking forces on H and pipe piles embedded in Fairbanks siit (1985, p.125-133) MP 1989 Kadluk ice stress measurement program (1985, p.86-100) MP 1899	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice (1980, 11p.) Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.) CR 80-12 Snow pads used for pipeline construction in Alsaka, 1976: CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.) CR 80-18 Performance of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Johnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature search (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.] CR 79-05 Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) Johnson, T.C. Resiliem modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials [1977, p.229-281] MP 1724 Effect of freeze-thaw cycles on resilient properties of fine-grained soils (1978, 19p.) Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt pavement [1978, p.662-
Method for measuring enriched levels of deuterium in 201 water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p. 37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, [1983, p. 15-26] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1604 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, 8p.) Impact of dredging on water quality at Kewaunee Harbor, Wisconsin (1984, 16p.) CR 83-22 Impact of slow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) Reverse phase HPLC method for analysis of TNT, RDX, HMX and 2,4-DNT in munitions wastewater (1984, 95p.) CR 84-30	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483, MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.42-47) In-ice calibration tests for an elongated, uniaxial brass ice stress sensor (1985, p.244-249) MP 1859 Frost heave forces on piling (1985, 2p.) MP 1950 Prost jacking forces on H and pipe piles embedded in Fair-banks sit (1985, p.125-133) MP 1950 Kadluk ice stress measurement program (1985, p.88-100) MP 1899 In-ice calibration tests for an elongate, uniaxial brass ice stress	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Serformance of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Jehnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature search [1977, 49p.] Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.] Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.] Jehnson, T.C. SR 80-35 Jehnson, T.C. MP 1078 Effect of freeze-thaw cycles on resilient properties of fine-grained soils (1978, 19p.) Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt pavement [1978, p.662-68] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt pavement [1978, p.662-68]
Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR 82-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions (1983, p.15-26) Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1664 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, 8p.) Impact of dredging on water quality at Kewaunce Harbor, Wisconsin (1984, 16p.) CR 84-22 Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179) MP 1819 Impact of alow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) CR 84-29 Toxic organics removal kinetics in overland flow lead treatment (1985, p.707-718) MP 2111	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 83-13 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.42-47) In-ice calibration tests for an elongated, uniaxial brass ice stress sensor (1985, p.244-249) MP 1920 In-ice validation tests for an elongated, uniaxial brass ice stress sensor (1985, p.244-249) MP 1930 Audibility within and outside deposited snow (1985, p.136-104) Froet jacking forces on H and pipe piles embedded in Fairbanks siit (1985, p.125-133) MP 1989 Kadluk ice stress measurement program (1985, p.86-100) MP 1899	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice (1980, 11p.) Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.) Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.) CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.) Performance of a point source bubbler under thick ice [1982, p.111-124] Johnson, R. Cements for structural concrete in cold regions [1977, 13p.) SR 77-35 Grouting of soils in cold environments: a literature search (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.) Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) Johnson, T.C. Resilient modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials [1977, p.229-281] Effect of freeze-thaw cycles on resilient properties of fine-grained soils [1978, 19p.) Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt powement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668]
Method for measuring enriched levels of deuterium in 2010 water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, 1983, p.15-26 flusivity of unasturated frozen soils at subzero temperatures (1983, p.889-893) MP 1604 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, 8p.) CR 83-22 Impact of dredging on water quality at Kewaunee Harbor, Wisconsin (1984, 16p.) Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179) MP 1819 Impact of alow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) CR 84-29 Toxic organics removal kinetics in overland flow land treatment (1985, p.707-718) MP 2111 Potential use of artificial ground freezing for contaminant inmobilization (1985, 10p.) MP 2029	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483, MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska, 1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.42-47) In-ice calibration tests for an elongated, uniaxial brass ice streas sensor (1985, p.244-249) MP 1859 Prost heave forces on piling (1985, 2p.) MP 1732 Audibility within and outside deposited snow (1985, p.136-142) Frost jacking forces on H and pipe piles embedded in Fairbanks ait (1985, p.125-133) MP 1990 In-ice calibration tests for an elongate, uniaxial brass ice streas sensor (1985, p.250-510) MP 1899 In-ice calibration tests for an elongate, uniaxial brass ice streas sensor (1985, p.506-510) MP 1899 In-ice calibration tests for an elongate, uniaxial brass ice streas sensor (1985, p.506-510) MP 1899 Landsat digital analysis of the initial recovery of the Kokolik	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice (1980, 11p.) Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.) CR 80-12 Snow pads used for pipeline construction in Alsaka, 1976. CR 80-13 Single and double reaction beam load cells for measuring ice forces [1980, 17p.) Performance of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Johnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature search (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.) Crouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) Johnson, T.C. Resilient modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials [1977, p.229-281] Influence of freeze-thaw cycles on resilient properties of fine-grained soils (1978, 19p.) Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, 59p.) Design of sirfield pavements for seasonal frost and permafrost
Method for measuring enriched levels of deuterium in 2010 water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, 1983, p.15-26 flusivity of unasturated frozen soils at subzero temperatures (1983, p.889-893) MP 1604 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, 8p.) CR 83-22 Impact of dredging on water quality at Kewaunee Harbor, Wisconsin (1984, 16p.) Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179) MP 1819 Impact of alow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) CR 84-29 Toxic organics removal kinetics in overland flow land treatment (1985, p.707-718) MP 2111 Potential use of artificial ground freezing for contaminant inmobilization (1985, 10p.) MP 2029	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska f1978, 81p.; Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checkins of flora (1985, 75p.) CR 83-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overving surface (1984, p.42-47) MP 1939 In-ice calibration tests for an elongated, uniaxial brass ice streas sensor (1985, p.244-249) MP 1859 Frost heave forces on piling (1985, 2p.) MP 1732 Audibility within and outside deposited snow (1985, p.136-142) Frost jacking forces on H and pipe piles embedded in Fairbanks silt (1985, p.125-133) MP 1930 Kadluk ice stress measurement program (1985, p.88-100) MP 1899 In-ice calibration tests for an elongate, uniaxial brass ice streas sensor (1985, p.506-510) MP 1989 In-ice calibration tests for an elongate, uniaxial brass ice streas sensor (1985, p.506-510) MP 1899 In-ice calibration tests for an elongate, uniaxial brass ice streas sensor (1985, p.506-510) MP 1899	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982, p.111-124] Jehnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature search (1977, 49p.] Grouting silt and sand at low temperatures—a laboratory investigation (1979, 33p.) Grouting silt and sand at low temperatures [1979, p.937-950] Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) SR 80-35 Johnson, T.C. Resilient modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials (1977, p.229-281) MP 1724 Effect of freeze-thaw cycles on resilient properties of fine-grained soils (1978, 19p.) Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement (1978, p.662-668) Influence of a sirfield pavements for seasonal frost and permafrost conditions (1978, 18p.) MP 1189
Method for measuring enriched levels of deuterium in 201 water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR 82-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, 1983, p.15-26) Soil-water diffusivity of unasturated frozen soils at subzero temperatures (1983, p.889-893) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, 8p.) CR 83-22 Impact of dredging on water quality at Kewaunce Harbor, Wisconsin (1984, 16p.) Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179) Impact of slow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) Reverse phase HPLC method for analysis of TNT, RDX, HMX and 2,4-DNT in munitions wastewater (1984, 95p.) CR 84-30 Toxic organics removal kinetics in overland flow land treatment (1985, p.707-718) MP 2029 Suitability of polyvinyl chloride pipe for monitoring TNT, RDX, HMX and DNT in groundwater (1985, 27p.) SR 88-512	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska, 1973, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) Stress measurements in ice (1983, 31p.) CR 85-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.42-47) In-ice calibration tests for an elongated, uniaxial brass ice streas sensor (1985, p.244-249) MP 1859 Frost heave forces on piling (1985, 2p.) MP 1732 Audibility within and outside deposited snow (1985, p.136-142) Frost jacking forces on H and pipe pilea embedded in Fairbanks silt (1985, p.125-133) Kadluk ice stress measurement program (1985, p.86-100) MP 1899 In-ice calibration tests for an elongate, uniaxial brass ice streas sensor (1985, p.506-510) MP 1899 In-ice calibration tests for an elongate, uniaxial brass ice streas sensor (1985, p.506-510) MP 1899 Landsat digital analysis of the initial recovery of the Kokolik River tundra fire area, Alaska (1973, p.543-547) MP 1668	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tensile stress relationship for load-bearing ice (1980, 11p.) Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.) CR 80-17 Snow pads used for pipeline construction in Alsaka, 1976: construction, use and breakup [1980, 28p.) CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.) Performance of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Johnson, R. Cements for structural concrete in cold regions [1977, 13p.) SR 77-35 Grouting of soils in cold environments: a literature search [1977, 49p.] Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.) Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) Johnson, T.C. Resilient modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials [1977, p.229-281] MP 1724 Effect of freeze-thaw cycles on resilient properties of fine-grained soils [1978, 19p.) Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668]
Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR 82-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p. 37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions (1983, p. 15-26) Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p. 889-893) MP 1661 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p. 889-893) MP 1662 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, p.) CR 83-22 Impact of dredging on water quality at Kewaunee Harbor, Wisconsin (1984, 16p.) CR 84-21 Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p. 172-179, MP 1819 Impact of slow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) CR 84-29 Toxic organics removal kinetics in overland flow land treatment (1985, p.707-718) Totalial use of artificial ground freezing for contaminant immobilization (1985, 10p.) MP 2029 Suitability of polyvinyl chloride pipe for monitoring TNT, RDX, HMX and DNT in groundwater (1985, 27p.) Comparison of extraction techniques and solvents for explo-	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483, MP 1245 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-118), MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overlying surface (1984, p.42-47) In-ice calibration tests for an elongated, uniaxial brasic estreas sensor (1985, p.244-249) MP 1930 Audibility within and outside deposited snow (1985, p.136-142) Frost jacking forces on H and pipe piles embedded in Fairbanks silt (1985, p.125-133) MP 1930 Kadluk ice stress measurement program (1985, p.136-100, MP 1930 In-ice calibration tests for an elongate, uniaxial brass ice streas sensor (1985, p.506-510) MP 1990 In-ice calibration tests for an elongate, uniaxial brass ice streas ensor (1985, p.506-510) MP 1990 In-ice calibration tests for an elongate, uniaxial brass ice streas ensor (1985, p.506-510) MP 1990 In-ice calibration tests for an elongate, uniaxial brass ice streas ensor (1985, p.506-510) MP 1990 In-ice calibration tests for an elongate, uniaxial brass ice streas ensor (1985, p.506-510) MP 1990 In-ice calibration tests for an elongate, uniaxial brass ice streas ensor (1985, p.506-510) MP 1990 In-ice calibration tests for an elongate, uniaxial brass ice streas ensor (1985, p.506-510) MP 1990 Recovery and settive layer changes following a tundra fire in	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Performance of a point source bubbler under thick ice [1982, p.111-124] Johnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-32 Grouting of soils in cold environments: a literature serant (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.] Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) Johnson, T.C. Resilient modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials [1977, p.229-281]. Influence of freeze-thaw cycles on resilient properties of fine-grained soils [1978, 19p.] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.66-668]. MP 106 Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.66-668]. MP 106 Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.66-668]. MP 107 Projected thermal and load-associated distress in pavements incorporating different grades of asphalt cement [1978, p.40-437]. MP 1209
Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) SR 82-30 Assessment of the treatability of toxic organics by overland flow (1983, 47p.) Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, (1983, p.15-26) Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1661 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, Bp.) Impact of dredging on water quality at Kewaunee Harbor, Wisconsin (1984, 16p.) CR 83-22 Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179) MP 1819 Impact of slow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) Reverse phase HPLC method for analysis of TNT, RDX, HMX and 2,4-DNT in munitions wastewater (1984, 95p.) CR 84-29 Toxic organics removal kinetics in overland flow land treatment (1985, p.707-718) MP 2019 Suitability of polyvinyl chloride pipe for monitoring TNT, RDX, HMX and DNT in groundwater (1985, 27p.) SR 85-12 Comparison of extraction techniques and solvents for explosive residues in soil (1985, 33p.) Interlaboratory evaluation of high-performance liquid	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483) Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska, 1978, 81p.; Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons buried under anow avalanche debris as compared to persons on the overtying surface (1984, p.42-47) In-ice calibration tests for an elongated, uniaxial brass ice atreas sensor (1985, p.244-249) Prost jacking forces on H and pipe piles embedded in Fairbanks silt (1985, p.125-133) MP 1930 Kadluk ice stress measurement program (1985, p.88-100) MP 1996 Johnson, L. Landsat digital analysis of the initial recovery of the Kokolik River tundra fire area, Alaska (1979, 15p.) MP 1638 Recovery and active layer changes following a tundra fire in northwestern Alaska (1983, p.43-4547) MP 254-2649 Polesson, L.A. MP 2113 Johnson, L.A.	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. CR 80-13 Snow pads used for pipeline construction in Alsaka, 1976. CR 80-15 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Experimence of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Jehasoa, R. Cements for structural concrete in cold regions [1977, 13p.] Grouting of soils in cold environments: a literature search (1977, 49p.) Grouting silt and sand at low temperatures—a laboratory investigation (1979, 33p.) Grouting silt and sand at low temperatures [1979, p.937-950] Resins and non-portland cements for construction in the cold (1980, 19p.) SR 80-35 Jehasoa, R.C. Resilient modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials [1977, p.229-281] MP 1028 Effect of freeze-thaw cycles on resilient properties of fine-grained soils [1978, 19p.] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668] Design of airfield pavements for seasonal frost and permafrost conditions [1978, 18p.] Design of airfield pavements for seasonal frost and permafrost conditions [1978, 18p.] Projected thermal and load-associated distress in pavements incorporating different grades of asphalt cement [1978, p.257-271] NP 1106
Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 (1982, 55p.) Assessment of the treatability of toxic organics by overland flow (1983, 47p.) CR 83-03 Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p. 37-46) MP 1632 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions, [1983, p.15-26] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1607 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1607 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, 8p.) CR 83-22 Impact of dredging on water quality at Kewaunee Harbor, Wisconsin (1984, 16p.) Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent (1984, p.172-179, MP 1819 Impact of alow-rate land treatment on groundwater quality: toxic organics (1984, 36p.) Reverse phase HPLC method for analysis of TNT, RDX, HMX and 2,4-DNT in munitions wastewater (1984, 95p.) CR 84-29 Toxic organics removal kinetics in overland flow land treatment (1985, p.707-718) Suitability of polyvinyl chloride pipe for monitoring TNT, RDX, HMX and DNT in groundwater (1985, 27p.) SR 85-12 Comparison of extraction techniques and solvents for explosive residues in soil (1985, 33p.) SR 85-22 Comparison of extraction techniques and solvents for explosive residues in soil (1985, 33p.) SR 85-22	America V. Antarctica (1977, p.322-325) MP 1095 20-yr cycle in Greenland ice core records (1979, p.481-483, MP 1248 Johnson, A.J. Revegetation and selected terrain disturbances along the trans-Alaska pipeline, 1975-1978 (1981, 115p.) CR 81-12 Johnson, A.W. Tundra disturbances and recovery following the 1949 exploratory drilling, Fish Creek, Northern Alaska 1978, 81p.; Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora (1985, 75p.) CR 85-11 Johnson, J.B. Surface integral method for determining ice loads on offshore structures from in situ measurements (1983, p.124-128) MP 2056 Stress measurements in ice (1983, 31p.) CR 83-23 Preferential detection of sound by persons on the overlying surface (1984, p.42-47) In-ice calibration tests for an elongated, uniaxial brase integral series sensor (1985, p.244-249) MP 1930 Audibility within and outside deposited snow (1985, p.136-142) Prost jacking forces on H and pipe piles embedded in Fairbanks silt (1985, p.125-133) MP 1930 Kadluk ice stress measurement program (1985, p.86-100, MP 1930 In-ice calibration tests for an elongate, uniaxial brase ice stress sensor (1985, p.250-510) MP 1930 Kadluk ice stress measurement program (1985, p.86-100, MP 1930 In-ice calibration tests for an elongate, uniaxial brase ice stress sensor (1985, p.506-510) MP 1930 Kadluk ice stress measurement program (1985, p.86-100, MP 1930 Recovery and active layer changes following a tundra fire in northwestern Alaska (1983, p.543-547) MP 1660 Revegetation along pipeline rights-of-way in Alaska (1984, p.254-264) MP 2113	Snow and ice roads in the Arctic [1979, p.1063-1071] MP 1223 Ice thickness-tenaile stress relationship for load-bearing ice [1980, 11p.] Roof leaks in cold regions: school at Chevak, Alsaka [1980, 12p.] Snow pads used for pipeline construction in Alsaka, 1976. CR 80-12 Snow pads used for pipeline construction in Alsaka, 1976. CR 80-17 Single and double reaction beam load cells for measuring ice forces [1980, 17p.] Experimence of a point source bubbler under thick ice [1982, p.111-124] MP 1529 Jehnson, R. Cements for structural concrete in cold regions [1977, 13p.] SR 77-35 Grouting of soils in cold environments: a literature search [1977, 49p.] Grouting silt and sand at low temperatures—a laboratory investigation [1979, 33p.] CR 90-5 Grouting silt and sand at low temperatures [1979, p.937-950] MP 1078 Resins and non-portland cements for construction in the cold (1980, 19p.] SR 80-35 Jehnson, T.C. Resilient modulus and Poisson's ratio for frozen and thawed silt and clay subgrade materials [1977, p.229-281] MP 1724 Effect of freeze-thaw cycles on resilient properties of fine-grained soils [1978, 19p.] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668] Influence of freezing and thawing on the resilient properties of a silt soil beneath an asphalt concrete pavement [1978, p.662-668] Design of airfield pavements for seasonal frost and permafrost conditions [1978, 18p.] Projected thermal and load-associated distress in pavements incorporating different grades of asphalt cement [1978, p.403-437] Resilient response of two frozen and thawed soils [1979, Resilient response of two frozen and thawed soils [1979, Resilient response of two frozen and thawed soils [1979, Resilient response of two frozen and thawed soils [1979, Resilient response of spense of spense of spense of soils [1979, Resilient response of two frozen and thawed soils [1979, Resilient response of spense of spense of spense of spense of spense of

Jehnson, T.C. (cont.) Asphalt concrete for cold regions; a comparative laboratory study and analysis of mixtures containing soft and hard	Keller, D.B. Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake i 978,	Keci, B.R. South Pole ice core drilling, 1981-1982 [1982, p.89-91] MP 1621
grades of asphalt cement [1980, 55p.] CR 80-05 Mathematical model to correlate frost heave of pavements with laboratory predictions [1980, 49p.] CR 80-10	24p.; SR 78-26 Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.; SR 82-30	Koh, G. Near-infrared reflectance of snow-covered substrates [1981, 17p.] CR 81-21
Embankment dams on permafrost in the USSR (1980, 59p.) SR \$0-41	Kelley, J.J. Carbon dioxide dynamics on the Arctic tundra [1971, p.48-	Snow crystal habit [1982, p.181-216] MP 1561 Visible propagation in falling anow as a function of mass con-
Results from a mathematical model of froat heave [1981, p.2- 6] MP 1483 Effect of freezing and thawing on resilient modulus of a granu-	52 ₁ MP 903 CO2 exchange in the Alaskan Arctic tundra: meteorological assessment by the aerodynamic method [1972, p.36-39]	centration and crystal type [1983, p.103-111] MP 1757 Snow characterization at SNOW-ONE-B [1983, p.155-
lar soil exhibiting nonlinear behavior [1981, p.19-26] MP 1484	MP 1375 Case for comparison and standardization of carbon dioxide	195 ₁ MP 1847 Performance of microprocessor-controlled anow crystal repli-
Revised procedure for pavement design under seasonal frost conditions (1983, 129p.) SE 83-27 Design implications of subsoil thawing (1984, p.45-103)	reference gases [1973, p.163-181] MP 964 Micrometeorological investigations near the tundra surface [1973, p.109-126] MP 1006	cator [1984, p.107-111] MP 1866 Forward-acattering corrected extinction by nonspherical particles [1984, p.261-271] MP 1870
MP 1706 Evaluation of seasonal variation in resilient modulus of granu-	Kendrick, G. Comparison of thermal observations of Mount St. Helens before and during the first week of the initial 1980 eruption	Approach to anow propagation modeling [1984, p.247-259] MP 1869 Ice fog as an electro-optical obscurant [1985, 11p.]
lar soil affecting pavement performance [1985, c21p.] MP 2076 Jones, S.J.	[1980, p.1526-1527] MP 1482 Kennedy, F.E., Jr.	CR 85-08 Forward-scattering corrected extinction by nonspherical par-
Mechanical properties of polycrystalline ice: an assessment of current knowledge and priorities for research [1979, 16p.] MP 1207	Dynamic friction of bobsled runners on ice [1985, 26p.] MP 2062 Kennedy, J.F.	ticles [1985, p.1023-1029] MP 1958 Wavelength-dependent extinction by falling snow [1986, p.51-55] MP 2019
Jordan, R. SNOW-TWO data report. Volume 2: System performance	Temperature and flow conditions during the formation of river ice [1970, 12p.] MP 1723	Kohnen, H. Ultrasonic measurements on deep ice cores from Antarctica (1978, p.48-50) MP 1202
[1984, 417p.] SR 84-20 Joubert, R.H.	River-ice problems: a state-of-the-art survey and assessment of research needs [1974, p.1-15] MP 1002 Laboratory investigation of the mechanics and hydraulics of	Ultrasonic velocity investigations of crystal anisotropy in deep ice cores from Antarctics (1979, 16p.)
Full-depth pavement considerations in seasonal frost areas [1979, 24p.] MP 1188 Pothole primer—a public administrator's guide to under-	river ice jams [1976, 97p.] MP 1060 Laboratory investigation of the mechanics and hydraulics of	CR 79-10 Ultrasonic velocity investigations of crystal anisotropy in deep ice cores from Antarctica (1979, p.4865-4874)
standing and managing the pothole problem [1981, 24p.] SR 81-21 Juma, N.G.	river ice jama [1977, 45p.] CR 77-09 Frazil ice formation [1984, 44p.] CR 84-18 Kerlher, R.	MP 1239 Relationship of ultrasonic velocities to c-axis fabrics and relaxation characteristics of ice cores from Byrd Station.
Soil microbiology [1981, p.38-44] MP 1753 Kachadourian, R.	Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366]	Antarctica (1979, p.147-153) MP 1282 Komárková, V.
Design considerations for airfields in NPRA [1978, p.441-458] MP 1086	MP 1160 Kerr, A.D. Bearing capacity of floating ice plates subjected to static or	Tundra disturbances and recovery following the 1949 ex- ploratory drilling, Fish Creek, Northern Alaska 1978, 81p.; CR 78-28
Kachi, H. Ice releasing block-copolymer coatings [1978, p.544-551] MP 1141	quasi-static loads (1976, p.229-268) MP 884 On the determination of horizontal forces a floating ice plate	Korhonen, C. CRREL roof moisture survey, Pease AFB Buildings 33, 116,
Kaderabak, T.J. Increasing the effectiveness of soil compaction at below-freez-	exerts on a structure [1978, p.123-134] MP 879 On the determination of horizontal forces a floating ice plate exerts on a structure [1978, 9p.] CR 78-15	122 and 205 [1977, 10p.] SR 77-02 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1398
ing temperatures [1978, 58p.] SR 78-25 Kalafat, J. Unconfined compression tests on snow: a comparative study	Critical velocities of a floating ice plate subjected to in-plane forces and a moving load [1979, 12p.] CR 79-19	Maintaining buildings in the Arctic (1977, p.244-251) MP 1508
[1977, 27p.] SR 77-20 Brazil tensile strength tests on sea ice: a data report [1977,	On the buckling force of floating ice plates [1981, 7p.] CR \$1-09	Infrared detective: thermograms and roof moisture [1977, p.41-44] MP 961 CRREL roof moisture survey, Building 208 Rock Island Ame-
39p. ₁ SR 77-24 Kana, D.L.	Mechanics of ice cover breakthrough [1984, p.245-262] MP 1997 Ice cover research—present state and future needs [1986,	nal [1977, 6p.] SR 77-43 Roof moisture survey: ten State of New Hampshire buildings
Seasonal regime and hydrological significance of stream icings in central Alaska [1973, p.528-540] MP 1026 Kaplar, C.W.	p.384-399 ₁ MP 2064 Kerr, R.	(1977, 29p.) CR 77-31 Detecting wet roof insulation with a hand-held infrared camera (1978, p.A9-A15) MP 1213
Effects of moisture and freeze-thaw on rigid thermal insula- tions: a laboratory investigation [1978, p.403-417] MP 1085	Vanadium and other elements in Greenland ice cores [1976, 4p.] CR 76-24 Vanadium and other elements in Greenland ice cores [1977,	Summary of Corps of Eagineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] SR 78-29
Karalius, J.A. Effect of temperature on the strength of frozen silt r1977,	p.98-102 ₁ MP 1092 Kettle, R.J.	Roof moisture survey.—U.S. Military Academy [1979, 8 reft.] SR 79-16
27p. ₁ CR 77-03 Kerim, M.F.	Soil freezing response: influence of test conditions [1985, p.49-58] MP 1990 Khalid, R.A.	Extending the useful life of DYE-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] SR 79-27
Frazil ice formation [1984, 44p.] CR 84-18 Kate, K. Determining the characteristic length of model ice sheets	Water movement in a land treatment system of wastewater by overland flow [1979, p.185-206] MP 1285	CRREL roof moisture survey, Pease AFB buildings 35, 63, 93, 112, 113, 120 and 220 (1980, 31p.) SR 80-14
[1982, p.99-104] MP 1870 Experiments on ice ride-up and pile-up [1983, p.266-270]	Wetlands for wastewater treatment in cold climates [1984, 9p. + figs.] MP 1945	Roofs in cold regions: Marson's Store, Claremont, New Hampshire [1980, 13p.] SR 88-25 Moisture detection in roofs with cellular plastic insulation—
Experimental determination of the buckling loads of floating ice sheets [1983, p.260-265] MP 1626	King, G.G. Growth and flowering of cottongrass tussocks along a climatic	West Point, New York, and Manchester, New Hampshire [1982, 22p.] SR 82-67 Infrared inspection of new roofs (1982, 14p.) SR 82-33
Ice forces on model bridge piers [1983, 11p.] CR 83-19 Ice action on two cylindrical structures [1983, p.159-166]	transect in northcentral Alaska [1984, p.10-11] MP 1950 Kirchlechner, P.	Examination of a blistered built-up roof: O'Neill Building, Hansoom Air Force Base [1983, 12p.] SE 83-21
MP 1643 loe action on pairs of cylindrical and conical structures [1983, 35p.] CR 83-25	Study of water drainage from columns of anow [1979, 19p.] CR 79-01	Locating wet cellular plastic insulation in recently construct- ed roofs [1983, p.168-173] MP 1729 Estimating transient heat flows and measuring surface tem-
lee force measurements on a bridge pier in the Ottauquechee River, Vermont [1983, 6p.] CR 83-32	Kittaka, S. Ice releasing block-copolymer coatings [1978, p.544-551] MP 1141	peratures of a built-up roof [1983, 20p.] SR 83-22 Can wet roof insulation be dried out [1983, p.626-639]
Ice action on two cylindrical structures [1984, p.107-112] MP 1741 Some effects of friction on its forms assists until 1989	Kivekës, L. Brittleness of reinforced concrete structures under arctic con-	MP 1509 Comparison of aerial to on-the-roof infrared moisture surveys (1983, p.95-105) MP 1709
Some effects of friction on ice forces against vertical struc- tures [1986, p.528-533] MP 2036 Estopodes, N.D.	ditions (1985, 28 + 14p.) MP 1969 Klemas, V. Use of remote sensing for the U.S. Army Corps of Engineers	Deteriorated concrete panels on buildings at Sondrestrom, Greenland [1984, 119.] SR 84-12
On zero-inertia and kinematic waves [1982, p.1381-1387] MP 2053	dredging program [1985, p.1141-1150] MP 1890 Comparison of SPOT simulator data with Landaat MSS im-	Secondary stress within the structural frame of DYE-3: 1978- 1983 [1984, 44p.] Deteriorated building panels at Sondrestrom, Greenland
Kaefinver, E. Computer file for existing land application of wastewater systems: a user's guide (1978, 24p.) SR 78-22	agery for delineating water masses in Delaware Bay, Broad- kill River, and adjacent wetlands (1985, p.1123-1129) MP 1909	[1985, p.7-10] MP 2017 Roof moisture surveys: yesterday, today and tomorrow [1985, p.438-443 + figs.] MP 2040
Keither, T.E. Antarcic sea ice dynamics and its possible climatic effects	Potential of remote sensing in the Corps of Engineers dredg- ing program [1985, 42p.] SR 85-20	Brittleness of reinforced concrete structures under arctic conditions (1985, 28 + 14p.) MP 1969
(1976, p.53-76) MP 1378 Comparison between derived internal dielectric properties and radio-echo sounding records of the ice sheet at Cape	Klouds, G.A. Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits (1977, p.302-306)	Roof blister valve [1986, p.29-31] MP 2138 Kosikowski, L. Rapid detection of water sources in cold regions—a selected
rotger, Antarctics (1978, 12p.) CR 78-04 Ice sheet internal radio-echo reflections and associated physi-	MP 1094 Interhemispheric comparison of changes in the composition	bibliography of potential techniques [1979, 75p.] SR 79-10
eal property changes with depth [1979, p.5675-5680] MP 1319 Keller, D.	of atmospheric precipitation during the Late Cenozoic era [1977, p.617-631] MP 1079 Koch, P.	Kovacs, A. Investigation of ice islands in Babbage Bight [1971, 46 leaves] MP 1381
Secondary stress within the structural frame of DYE-3: 1978-1983 (1984, 44p.) SR 84-26	Analysis of roof snow load case studies; uniform loads [1983, 29p.]	Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) [1974, p.119-138] MP 1035

Islands of grounded ice [1975, p.213-216] MP 852	Investigations of sea ice anisotropy, electromagnetic proper-	Elemental analyses of ice crystal nuclei and aerosols [1977,
Islands of grounded sea ice [1976, 24p.] CR 76-04 Thickness and roughness variations of arctic multiyear sea ice	ties, strength, and under-ice current orientation (1980, 18p.) CR 80-20	5p. ₁ MP 1191 Antarctic soil studies using a scanning electron microscope
[1976, 25p.] CR 76-18	Dynamics of near-shore ice [1981, p.125-135] MP 1599	[1978, p.106-112] MP 1386 Measurement and identification of aerosols collected near
Study of piles installed in polar snow [1976, 132p.] CR 76-23	Sea ice rubble formations off the northeast Bering Sea and	Barrow, Alaska [1978, 6p.] CR 78-20
Dynamics of near-shore ice [1976, p.9-34] MP 1380	Norton Sound coasts of Aisaks [1981, p.1348-1363] MP 1527	Electron microscope investigations of frozen and unfrozen bentonite [1979, 14p.] CR 79-28
Some characteristics of grounded floebergs near Prudhoe Bay, Alaska [1976, p.169-172] MP 1118	Sea ice piling at Fairway Rock, Bering Strait, Alaska: observa-	Disinfection of wastewater by microwaves (1980, 15p.)
Grounded ice in the fast ice zone along the Beaufort Sea coast	tions and theoretical analysis [1981, p.985-1000] MP 1460	SR 80-01 Formation of ice crystals and dissipation of supercooled fog
of Aleska [1976, 21p.] CR 76-32 Some characteristics of grounded floebergs near Prudhoe Bay,	Pooling of oil under sea ice 1981, p.912-922	by artificial nucleation, and variations of crystal habit at
Alaska [1976, 10p.] CR 76-34	MP 1459 Ice pile-up and ride-up on arctic and subarctic beaches	early growth stages [1982, p.579-587] MP 1539 Elemental compositions and concentrations of micros-
Dynamics of near-shore ice [1976, p.267-275] MP 922 Dynamics of near-shore ice [1977, p.106-112] MP 924	[1981, p.247-273] MP 1538	pherules in snow and pack ice from the Weddell Ses [1983,
Dynamics of near-shore ice [1977, p.151-163]	Multi-year pressure ridges in the Canadian Beaufort Sea [1981, p.125-145] MP 1514	p.128-131 ₁ MP 1777 Morphology and ecology of diatoms in sea ice from the Wed-
MP 1073 Sea ice thickness profiling and under-ice oil entrapment	High-resolution impulse radar measurements for detecting	dell Sea [1984, 41p.] CR 84-05
[1977, p.547-550] MP 940	sea ice and current alinement under the Ross Ice Shelf [1981, p.96-97] MP 1543	Acidity of snow and its reduction by alkaline aerosols (1985, p.92-94) MP 2008
Stake driving tools: a preliminary survey [1977, 43p.] SR 77-13	Sea ice rubble formations in the Bering Sea and Norton	Kurtz, M.K.
Runway site survey, Pensacola Mountains, Antarctica	Sound, Alaska [1981, 23p.] SR 81-34 Brine zone in the McMurdo Ice Shelf, Antarctica [1982,	Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings] MIP 1034
[1977, 45p.] SR 77-14 Unconfined compression tests on snow: a comparative study	p.166-171 ₁ MP 1550	Kyriakakie, T.
[1977, 27p.] SR 77-20	Bering Strait sea ice and the Fairway Rock icefoot [1982, 40p.] CR 82-31	User's guide for the BIBSORT program for the IBM-PC personal computer [1985, 61p.] SR 85-04
Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.533-546] MP 1066	Brine zone in the McMurdo Ice Shelf, Antarctica [1982,	Lecombe, J.
Study of a grounded floeberg near Reindeer Island, Alaska	28p.j CR 82-39 Effects of conductivity of high-resolution impulse radar	Measurements of airborne-snow concentration [1982, p.225- 281] MP 1563
[1977, 9p.] MP 1751 Brazil tensile strength tests on sea ice: a data report £1977,	sounding, Ross Ice Shelf, Antarctica [1982, 12p.]	Airborne-Snow Concentration Measuring Equipment (1982,
39p.j SR 77-24	CR 82-42 Shore ice ride-up and pile-up features. Part 1: Alaska's Beau-	p.17-46; MP 1981 Performance and optical signature of an AN/VVS-1 laser
Neurahore ice motion near Prudhoe Bay, Alaska (1977, p.23- 31) MP 1162	fort Sea coast (1983, 51p.) CR 83-09	rangefinder in falling snow: Preliminary test results [1983,
Detection of moisture in construction materials [1977, 9p.]	Chemical fractionation of brine in the McMurdo Ice Shelf, Antarctica [1983, 16p.] CR 83-06	p.253-266 ₁ MP 1759 Visible propagation in falling snow as a function of mass con-
CR 77-25 Dynamics of near-shore ice [1977, p.411-424]	Detection of cavities under concrete pavement [1983, 41p.]	centration and crystal type [1983, p.103-111] MP 1757
MP 1076	CR 83-18 Characteristics of multi-year pressure ridges (1983, p.173-	Snow characterization at SNOW-ONE-B [1983, p.155-
Dielectric constant and reflection coefficient of the snow sur- face and near-surface internal layers in the McMurdo Ice	182 ₁ MP 1698	195 ₁ MP 1847 Technique for measuring the mass concentration of falling
Shelf [1977, p.137-138] MP 1011	Sea ice on the Norton Sound and adjacent Bering Sea coast (1983, p.654-666) MP 1699	snow [1983, p.17-28] MP 1647
Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica (1977, p.146-148) MP 1013	Electromagnetic properties of ses ice [1984, 32p.] CR 84-02	Comparative near-millimeter wave propagation properties of snow or rain [1983, p.115-129] MP 1690
Iceberg thickness profiling using an impulse radar [1977,	Electromagnetic properties of sea ice (1984, p.53-75)	Attenuation and backscatter for anow and sleet at 96, 140, and
p.140-142 ₁ MP 1012 Dynamics of near-shore ice (1977, p.503-510 ₁	MP 1776	225 GHz [1984, p.41-52] MP 1864 Tank E/O sensor system performance in winter: an overview
MP 1200	Forces associated with ice pile-up and ride-up [1984, p.239- 262] MP 1887	[1985, 26p.] MP 2073
Iceberg thickness and crack detection (1978, p.131-145; MP 1128	Shore ice ride-up and pile-up features. Part 2: Alaska's Beau-	Ledanyl, B. General report session 2: mechanical properties (1979, p.7-
Destruction of ice islands with explosives [1978, p.753-765]	fort Sea coast—1983 and 1984 [1984, 28p. + map] CR 84-26	18 ₇ MP 1726
MP 1018		
	Authors' response to discussion on: Electromagnetic proper-	Length, G.A. Length of the server of analysis of 986 in 57-66. MP 2106
leeberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978,	Authors' response to discussion on: Electromagnetic proper- ties of sea ice (1984, p.95-97) MP 1822 Messuring multi-year sea ice thickness using impulse radar	Ice gouge hazard analysis (1986, p.57-66) MP 2106 Lame, J.W.
looberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916	Ice gouge hazard analysis (1986, p.57-66) MP 2106 Lane, J.W. Optical properties of salt ice [1975, p.363-372]
leaberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01	tics of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953	Ice gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) MP 854 De-icing using lasers (1976, 25p.) CR 76-10
losberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orien-	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40)	Ice gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.)
leaberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Axial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year	Ice gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) MP 854 De-icing using lasers (1976, 25p.) CR 76-10
leaberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Axial double point-load tests on snow and ice [1978, 11p.] CR 78-61 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902	Ice gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-
losberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62) MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 2018 See [ice pressure ridges in the Beaufort Sea [1978, p.249-	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) MP 1901	Ice gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Roof response to icing conditions (1979, 40p.) Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langlebea, M.P.
leaberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Arial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the MP 11187 an Beaufort Sea [1978, p.519-532] MP 1187	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) Apparent unconfined compressive strength of multi-year sea ice (1985, p.116-127) Ice island fragment in Stefansson Sound, Alaska (1985,	Ice gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Roof response to icing conditions (1979, 40p.) Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langlebea, M.P.
losberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.519-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] Dynamics of near-shore ice [1978, p.11-22] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1900 Blectromagnetic measurements of multi-year sea ice using	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Roof response to icing conditions (1979, 40p.) Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langstea, D.
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1113 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1130 Dynamics of near-shore ice [1976, p.11-22] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.71-2) MP 1232 Dynamics of near-shore ice [1978, p.230-233]	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.116-127) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) CR 85-13	Ice gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of anow (1981, p.3-14) Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langston, D. Growth history of lake ice in relation to its stratigraphic,
losberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Axial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.319-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 2103 Dynamics of near-ahore ice [1978, p.11-22] MP 1203 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1900 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, p.56-9) CR 85-13 Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Roof response to icing conditions (1979, 40p.) CR 76-10 Roof response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langston, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) (CR 77-01)
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.519-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1202 Dynamics of near-shore ice [1978, p.11-22] MP 1202 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.71-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) CR 85-13 Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Krets, R.A.	Ice gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langston, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr.
losberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Axial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.319-532] MP 1137 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] Dynamics of near-shore ice [1978, p.11-22] MP 1232 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Eretg, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) Desicing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langloben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langston, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22)
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Axial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.519-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1232 Dynamics of near-shore ice [1978, p.11-22] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.71-12) MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.163-172) MP 1179	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1900 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Kretg, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bsy, Alaska (1983, 230p.)	Ice gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) Lang, T.E. Constitutive relation for the deformation of anow (1981, p.3-14) Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) MP 1370 Langstee, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) MP 998
losberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Axial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1132 Dynamics of near-shore ice [1978, p.11-22] MP 1232 Dynamics of near-shore ice [1978, p.30-233] MP 1819 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Meassurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] Remote detection of water under ice-covered lakes on the	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Blectromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, p.67-93) MP 2020 Kreig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409)	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) Desicing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langlobea, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langston, D. Crowth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) Oxygen isotope profiles through the Antarctic and Green and ice sheets (1972, p.429-434) MP 997
losberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Axial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.319-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1203 Racent ice observations in the Alaskan Beaufort Sea federal-state lease area [1978, p.7-12] MP 1203 Racent ice observations in the Alaskan Beaufort Sea federal-state lease area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Measurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.1641-72] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafost along the	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) Ide island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1900 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Kretz, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 2097 Krals, G.	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice (1975, p.363-372) MP \$54 De-icing using lasers (1976, 25p.) Roof response to icing conditions (1979, 40p.) CR 76-10 CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) MP 1370 Langleben, M.P. Comment on Water drag coefficient to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets (1972, p.429-434) MP 9972 C-14 and other isotope andless on natural ice (1972, p.1970-71)
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1113 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.71-12] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.71-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder ass priedine	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Blectromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, p.67-93) MP 2020 Kreig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409)	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) Desicing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langstee, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) Crystalline and mechanical structure (1977, 24p.) Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) Oxygen isotope profiles through the Antarctic and Greenland ice sheets (1972, p.429-434) MP 997 C-14 and other isotope atudies on natural ice (1972, p.170-D92) Polar ice-core storage facility (1976, p.71-75) MP 874
losberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.319-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1203 Paramics of near-shore ice [1978, p.11-22] MP 1203 Racent ice observations in the Alaskan Beaufort Sea federal-state lease area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Measurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.184-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279] Remote detection of a freshwater pool off the Sagavanirktok	Messuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) Apparent unconfined compressive strength of multi-year sea ice (1985, p.151-167) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Electromagnetic measurements of multi-year (1986, p.67-93) Electromagnetic measurements of multi-year (1986,	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice (1975, p.363-372) MP 854 De-icing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 76-10 CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by MP. Langleben (1983, p.779-782) MP 1577 Langstes, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets (1972, p.429-434) C-14 and other isotope studies on natural ice (1972, p.170-D92) Polar ice-core storage facility (1976, p.71-75) MP 874 Vanadium and other elements in Greenland ice cores (1976,
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of see ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1113 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 1187 See ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder ass pipeline (1979, p.268-279) MP 1175 Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1224	ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, p.67-93) Eretg, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) Krah, G. Soil microbiology (1981, p.38-44) MP 1753 Kagzrah, F.K.	lce gouge hazard analysis (1986, p.57-667 Lane, J.W. Optical properties of sait ice [1975, p.363-372] MP \$54 De-icing using lasers [1976, 25p.] Roof response to icing conditions [1979, 40p.] CR 76-10 Roof response to icing conditions [1979, 40p.] Lang, T.E. Constitutive relation for the deformation of snow [1981, p.3-141] Langleben, M.P. Comment on Water drag coefficient of first-year sea ice' by M.P. Langleben [1983, p.779-782] MP 1370 MP 1370 Langleben, M.P. Comment on Water drag coefficient of its stratigraphic, crystalline and mechanical structure [1977, 24p.] CR 77-01 Langwy, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22] MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] C-14 and other isotope atudies on natural ice [1972, p.170-D92] Polar ice-core storage facility [1976, p.71-75] MP 974 Vanadium and other elements in Greenland ice cores [1976, 4p.] Seasonal variations of chemical constituents in annual layers
leeberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Axial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.319-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1203 Racent ice observations in the Alaskan Beaufort Sea federal-state lease area [1978, p.7-12] MP 1203 Racent ice observations in the Alaskan Beaufort Sea federal-state lease area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-485] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279] MP 1179 Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1224 Icebergs: an overview [1979, 7p.] In MP 1124 Icebergs: an overview [1979, 7p.]	Messuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.151-167) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1900 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Exest, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1985, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 1640 Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 2097 Exest, G. Soil microbiology (1981, p.38-44) MP 1753 Exegrals, F.E. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Miguings on isostatic imbalance as a mechanism for sea ice cracking (1976, p.85-94) MP 1379	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 76-10 Rocf response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langlebea, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) MP 1377 Langstea, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets (1972, p.429-434) C-14 and other isotope atudies on natural ice (1972, p.170-D92) Polar ice-core storage facility (1976, p.71-75) MP 874 Vanadium and other elements in Greenland ice cre 1976, e.76-24
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1132 Dynamics of near-shore ice [1978, p.11-22] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] Measurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1179 Remote detection of massive ice in permafroat along the Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279] MP 1178 Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1224 Icebergs: an overview [1979, 7p.] SR 79-21 Ice pils-up and ride-up on Arctic and subarctic beaches	ties of sea ice (1984, p.95-97) Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Blectromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, p.67-93) Ereig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1983, 230p.) Ereig, R.A. Soil microbiology (1981, p.38-44) MP 1753 Kagzrak, F.E. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Misgivings on isostatic imbalance as a mechanism for sea ice	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice [1975, p.363-372] MP 854 De-icing using lasers [1976, 25p.] Roof response to icing conditions [1979, 40p.] CR 76-10 CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on Water drag coefficient of first-year sea ice' by MP 1577 Langleben, D. Growth history of lake ice in relation to its strattgraphic, crystalline and mechanical structure [1977, 24p.] CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22] MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] C-14 and other isotope atudies on natural ice [1972, p.170-1992] Polar ice-core storage facility [1976, p.71-75] WP 1982 Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits [1977, p.302-306] MP 1094 Vanadium and other elements in Greenland ice cores [1976, MP 1094 Vanadium and other elements in Greenland ice cores [1976, p.71-92-1902-1977, p.302-306] MP 1094 Vanadium and other elements in Greenland ice cores [1977, p.302-306]
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1113 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.71-12] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.71-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Measurement of mesoscale deformation of Beaufort sea ice (AIDIEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline (1979, p.268-279) Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.107-126)	Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1900 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) CR 85-13 Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Kreig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bsy, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) Krals, G. Soil microbiology (1981, p.38-44) MP 1753 Kagzrak, F.K. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Misgivings on isostatic imbalance as a mechanism for sea ice cracking (1976, p.85-94) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1032	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) Desicing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langlebea, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langston, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) Oxygen isotope profiles through the Antarctic and Greenland ice sheets (1972, p.429-434) Polar ice-core storage facility (1976, p.71-75) Vanadium and other elements in Greenland ice cores (1976, 4p.) Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits (1977, p.302-306) MP 1094 MP 1094
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.519-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] Dynamics of near-shore ice [1978, p.11-22] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12, MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 139 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279, p.127-146] MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.107-1267 Amp 1230 MP 1230 MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.107-1267 Amp 1230 Amsottopic properties of sea ice in the 50- to 150-MHz range	ties of sea ice (1984, p.95-97) Messuring multi-year sea ice thickness using impulse radar (1985, p.55-67) Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) Impulse radar sounding of frozen ground (1985, p.28-40) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Blectromagnetic measurements of multi-year sea ice using impulse radar (1985, 26-) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) Kreig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) Krah, G. Soil microbiology (1981, p.38-44) MP 1753 Kegzrak, F.E. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) CR 76-18 Misgivings on isostatic imbalance as a mechanism for sea ice cracking (1976, p.85-94) Khah, P.M. Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1032 Kutvinea, K.C.	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice [1975, p.363-372] De-icing using lasers [1976, 25p.] Roof response to icing conditions [1979, 40p.] CR 76-10 Roof response to icing conditions [1979, 40p.] CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow [1981, p.3-14] Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by MP 1577 Langstea, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure [1977, 24p.] CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22] MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] C-14 and other isotope studies on natural ice [1972, p.170-D92] Polar ice-core storage facility [1976, p.71-75, MP 198-102] Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits [1977, p.302-306] WP 1094 Vanadium and other elements in Greenland ice cores [1976, p.71-98-102] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica [1977, p.322-325] MP 1995 MP 1995 MP 1995
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1113 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline (1979, p.268-279) Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.107-126) MM 1289 Oli pooling under sea ice [1979, p.310-323] MP 1289 Oli pooling under sea ice [1979, p.310-323] MP 1289 Oli pooling under sea ice [1979, p.310-323] MP 1289	Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1901 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) CR 85-13 Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Kreig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) Krals, G. Soil microbiology (1981, p.38-44) MP 1753 Kagarak, F.E. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) MP 1753 Kagarak, F.E. Thisteness and roughness variations of arctic multiyear sea ice cracking (1976, p.85-94) MR 1032 Katyasea, E.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1032	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice [1975, p.363-372] MP 854 De-icing using lasers [1976, 25p.] CR 76-10 Roof response to icing conditions [1979, 40p.] CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow [1981, p.3-14] Langleben, M.P. Comment on Water drag coefficient of first-year sea ice' by M.P. Langleben [1983, p.779-782] MP 1577 Langstes, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure [1977, 24p.] CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22] MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] Cli and other isotope studies on natural ice [1972, p.170-D92] Polar ice-core storage facility [1976, p.71-75] MP 1092 Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits [1977, p.302-306] WP 1094 Vanadium and other elements in Greenland ice cores [1976, p.71-98-102] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica [1977, p.322-325] Interhemispheric comparison of changes in the composition of atmospheric precipitation during the Late Cemozoic era
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.519-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.712-2] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.712-2] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Messurement of mesoscale deformation of Beaufort sea ice (AIDJEK-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279, p.126-279, p.127-146] MP 1130 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.127-126, MP 1230 MP 1239 MP 1239 Diponing under sea ice [1979, p.310-323] MP 1289 Dynamics of near-shore ice [1979, p.181-207]	Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1901 Blectromagnetic measurements of multi-year sea ice using impulse radar (1985, 26-) MP 1901 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26-) MP 2020 Kreig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) Krah, G. Soil microbiology (1981, p.38-44) MP 1753 Kagarak, F.E. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) CR 76-18 Misgivings on isostatic imbalance as a mechanism for sea ice (1976, 25p.) MP 1379 Kusha, P.M. Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1032 Kutvinea, E.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1621 Ice drilling technology (1984, 142p.) SR 84-34	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Roc f response to icing conditions (1979, 40p.) CR 76-10 Roc f response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langlebea, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langlebea, (1983, p.779-782) Langsteea, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets (1972, p.429-434) C-14 and other isotope studies on natural ice (1972, p.D70-D92) Polar ice-core storage facility (1976, p.71-75) MP 1052 Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits (1977, p.302-306) Vanadium and other elements in Greenland ice cores (1976, p.98-102) NP 1092 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica (1977, p.322-325) MP 1095 Interhemispheric comparison of changes in the composition of atmospheric precipitation during the Late Cenozoic era (1977, p.517-631) MP 1079 MP 1079
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 1182 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent lee observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.468-458] MP 1179 Remote detection of massive ice in permafroat along the Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279] MP 1178 Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1124 Icebergs: an overview [1979, 7p.] SR 79-21 Ice pils-up and ride-up on Arctic and subarctic beaches (1979, p.127-146) Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.17-149-375) MP 1239 Anisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.5749-3759) Di pooling under sea ice [1979, p.181-207) Anisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.5749-3759) Dynamics of near-shore ice [1979, p.181-207)	Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1952 Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 20-) CR 85-13 Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Erretz, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 2097 Errah, G. Soil microbiology (1981, p.38-44) MP 1753 Engarak, F.E. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) MP 1759 Kusayrak, F.E. Thickness and roughness variations of arctic multiyear sea ice cracking (1976, p.85-94) MP 1032 Extrans, E.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1032 Kalla, J.B. Oxygen isotope investigation of the origin of the basal zone	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice [1975, p.363-372] De-icing using lasers [1976, 25p.] Roof response to icing conditions [1979, 40p.] CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by MP 1577 Langstea, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure [1977, 24p.] CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22] MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] C-14 and other isotope studies on natural ice [1972, p.170-D92] Polar ice-core storage facility [1976, p.71-75] WP 1982 Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits [1977, p.302-306] Vanadium and other elements in Greenland ice cores [1976, p.8-102] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica [1977, p.322-325] MP 1092 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica [1977, p.322-325] MP 1097 Atmospheric trace metals and sulfate in the Greenland ice Sheet [1977, p.515-920] MP 949
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1113 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline (1979, p.268-279) MP 1175 Remote detection of a freahwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.107-126) Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.107-126) AMP 1239 Dipooling under sea ice [1979, p.310-323] Dynamics of near-shore ice [1979, p.181-207) Anisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.3749-5759) Dipooling under sea ice (1979, p.181-207) Anisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.3749-3535) Subsurface messurements of McMurdo Ice Shelf (1979,	Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.151-167) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1900 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) CR 85-13 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) MP 2020 Kreig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1985, 230p.) MP 1640 Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 2097 Krak, G. Soil microbiology (1981, p.38-44) MP 1753 Kagzrak, F.E. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) MP 1753 Kagzrak, F.E. Misgivings on isostatic imbalance as a mechanism for sea ice cracking (1976, p.85-94) MP 1379 Kuha, P.M. Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1032 Kativasea, E.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1032 Kalla, J.B.	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of salt ice (1975, p.363-372) MP 854 De-icing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 76-10 Roc fresponse to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by MP 1370 Langleben, M.P. Comment on 'Water drag coefficient of first-year sea ice' by MP 1877 Langleben, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets (1972, p.429-434) C-14 and other isotope atudies on natural ice (1972, p.D70-192) Polar ice-core storage facility (1976, p.71-75) MP 1082 Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits (1977, p.302-306) MP 1094 Vanadium and other elements in Greenland ice cores (1974, p.98-102) Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctics (1977, p.322-325) MP 1092 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctics (1977, p.322-325) MP 1097 Atmospheric trace metals and sulfate in the Greenland ice Sheet (1977, p.915-920) MP 949 LaPotia, J.A.
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] Axial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.519-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.712, MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.712, MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 139 Measurement of neas-shore ice [1978, p.230-233, MP 1619 Ressurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172, MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of water under ice-covered lakes on the Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279, p.161-164] Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.107-126] Anisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.5149-5759) Oil pooling under sea ice (1979, p.310-323, MP 1239 Dynamics of near-shore ice [1979, p.310-323, MP 1239 Dynamics of near-shore ice [1979, p.310-323, MP 1239 Dynamics of near-shore ice [1979, p.181-207, MP 1239 Subsurface measurements of McMurdo lee Shelf [1979, p.79-80, MP 1338	Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1952 Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.10-115) Blectromagnetic measurements of multi-year sea ice using impulse radar (1985, p.20-) CR 85-13 Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Kretz, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 2097 Krah, G. Soil microbiology (1981, p.38-44) MP 1753 Kagzrak, F.K. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) CR 76-18 Misgivings on isostatic imbalance as a mechanism for sea ice cracking (1976, p.85-94) MP 1379 Kuha, P.M. Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) Kuha, J.B. Oxygen isotope investigation of the origin of the basal zone of the Matanuska Glacier, Alaska (1978, p.673-685) MP 1277 Kumai, M.	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice (1975, p.363-372) De-icing using lasers (1976, 25p.) Rocf response to icing conditions (1979, 40p.) CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langlebea, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langlebea (1983, p.779-782) Langstea, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure (1977, 24p.) CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets (1972, p.429-434) C-14 and other isotope studies on natural ice (1972, p.170-192) Polar ice-core storage facility (1976, p.71-75) MP 1092 Stable isotope profile through the Ross Ice Sheff at Little America V, Antarctica (1977, p.32-306) Vanadium and other elements in Greenland ice corea (1977, p.98-102) Stable isotope profile through the Ross Ice Sheff at Little America V, Antarctica (1977, p.32-306) MP 1099 Stable isotope profile through the Ross Ice Sheff at Little America V, Antarctica (1977, p.32-325) MP 1092 Stable isotope profile through the Ross Ice Sheff at Little America V, Antarctica (1977, p.32-325) MP 1097 Atmospheric trace metals and sulfate in the Composition of atmospheric precipitation during the Late Cenozoic era (1977, p.617-631) Analysis of the Revere, Quincy and Stamford structure data bases for predicting building material distribution (1985).
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1113 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea (1978, p.249-271) MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12, MP 1232 Dynamics of near-shore ice [1978, p.30-233] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump tation feeder gas pipeline [1979, p.268-279] MP 1175 Remote detection of a freshwater pool off the Sagvanirktok River delta, Alaska [1979, p.161-164] MP 1279 Les pila-up and ride-up on Arctic and subarctic beaches (1979, p.171-146) MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.171-146) MP 1230 My 1230 My 1230 My 1230 My 1230 My 1230 All 1230 My 1231 All 1230 My 1231 All 1230 My 1231 All 1230 My 1232 All 1233 My 1233 All 12	Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.16-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1900 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) CR 85-13 Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Kreig, R.A. Guidebook to permafrost and related features along the Ellictt and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 2097 Krab, G. Soil microbiology (1981, p.38-44) MP 1753 Kagzrak, F.E. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) MP 1379 Kusha, P.M. Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1032 Kativasea, E.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1032 Kativasea, E.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1621 Ice drilling technology (1984, 142p.) SR 84-34 Kalla, J.B. Oxygen isotope investigation of the origin of the basal zone of the Matanuska Glacier, Alaska (1978, p.673-685) MP 1177 Kussei, M. Identification of nuclei and concentrations of chemical species in snow crystals sampled at the South Pole (1976,	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice [1975, p.363-372] De-icing using lasers [1976, 25p.] Roof response to icing conditions [1979, 40p.] CR 76-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langsten, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure [1977, 24p.] CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] Cli and other isotope studies on natural ice [1972, p.170-D92] Polar ice-core storage facility [1976, p.71-75] Vanadium and other elements in Greenland ice cores [1976, 4p.] Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits [1977, p.302-306] Vanadium and other elements in Greenland ice cores [1976, p.81-102] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica [1977, p.322-325] MP 1092 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica [1977, p.322-325] MP 1095 Interhemispheric comparison of changes in the composition of atmospheric precipitation during the Late Cenozoic era (1977, p.617-631) Amospheric trace metals and sulfate in the Greenland Ice Sheet (1977, p.915-920) Lapotta, P.J. Analysis of the Revere, Quincy and Stamford structure data bases for predicting building materials data base for New
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] Axial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.519-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] Dynamics of near-shore ice [1978, p.11-22] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federalstate lesse area [1978, p.7-12, MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1619 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c axes of ice crystals [1978, p.6037-6046] MP 1139 Messurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1979, p.48-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279, p.268-279, p.268-279, p.127-146] Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.126-164) MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.127-126, MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.127-126, MP 1230 Milti year pressure ridges in the Canadian Beaufort Sea (1979, p.549-5759) Oli pooling under sea ice [1979, p.181-207) Amisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.549-5759) Oli pooling under sea ice [1979, p.181-207) Amisotropic properties of sea ice in the 50- to 180-MHz range (1979, p.549-5759) Oli pooling under sea ice [1979, p.181-207) MP 1238 Shore ice pile-up and ride-up: field observations, models, theoretical analysee (1980, p.209-298) MP 1338 Shore ice pile-up and ride-up: field observations, models, theoretical analysee (1980, p.209-298) MP 189-181	Messuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1953 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1952 Apparent unconfined compressive strength of multi-year sea ice (1985, p.151-167) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) MP 1900 Bloctromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Kreig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Pox to Prudhoe Bay, Alaska (1983, 230p.) MP 1640 Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 2097 Krah, G. Soil microbiology (1981, p.38-44) MP 1753 Kagzrak, F.K. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Misgivings on isostatic imbalance as a mechanism for sea ice cracking (1976, p.85-94) MP 1032 Kathan, P.M. Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1032 Kathan, P.M. Causal, M. Identification of nuclei and concentrations of chemical species in snow crystals sampled at the South Pole (1976, p.83-841) MP 853	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice [1975, p.363-372] De-icing using lasers [1976, 25p.] Roc f response to icing conditions [1979, 40p.] CR 76-10 Roc f response to icing conditions [1979, 40p.] CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow [1981, p.3-14] Langlebea, M.P. Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben [1983, p.779-782] Langstea, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure [1977, 24p.] CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22] MP 978 Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] C-14 and other isotope atudies on natural ice [1972, p.D70-D92] Polar ice-core storage facility [1976, p.71-75] WP 1082 Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits [1977, p.302-306] Vanadium and other elements in Greenland ice cores [1976, p.98-102] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica (1977, p.322-325) MP 1092 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica (1977, p.322-325) MP 1092 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica (1977, p.322-325) MP 1097 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica (1977, p.322-325) MP 1097 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica (1977, p.322-325) MP 1097 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica (1977, p.322-325) MP 1097 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica (1977, p.322-325) MP 1097 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica (1977, p.322-325) MP 1098 Stable isotope profile through the Ross Ice Shelf at
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62) MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] Radar anisotropy of sea ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1111 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.19-532] Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1252 Dynamics of near-shore ice [1978, p.230-233] MP 1369 Measurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1179 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279] Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1178 Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1242 Icebergs: an overview [1979, 7p.] SE 79-21 Ice pile-up and ride-up on Arctic and subarctic beaches (1979, p.107-126] Anisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.5749-5759) Oil pooling under sea ice (1979, p.310-323) Dynamics of near-shore ice [1979, p.310-323] MP 1238 Unvestigations of sea ice anisotropy, electromagnetic properties, strength and under-ice current orientation, [1980, p.109-153] MP 1333 Shore ice pile-up and ride-up: field observations, models, theoretical analyses [1980, p.209-298) MP 1338 Investigations of sea ice anisotropy, electromagnetic properties, strength and under-ice current orientation, [1980, p.109-153]	Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1952 Apparent unconfined compressive strength of multi-year sea ice (1985, p.161-127) MP 1901 Ice island fragment in Stefansson Sound, Alaska (1985, p.101-115) Blectromagnetic measurements of multi-year sea ice using impulse radar (1985, 26). Electromagnetic measurements of multi-year sea ice using impulse radar (1986, p.67-93) MP 2020 Kretz, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) Errain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 2097 Krah, G. Soil microbiology (1981, p.38-44) MP 1753 Kagzrak, F.K. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) MP 1379 Kuha, P.M. Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1032 Kutinea, K.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1032 Kutinea, K.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1621 Ice drilling technology (1984, 142p.) SR 84-34 Kulla, J.B. Oxygen isotope investigation of the origin of the basal zone of the Matanuska Glacier, Alaska (1978, p.673-685) MP 1177 Kumai, M. Identification of nuclei and concentrations of chemical species in snow crystals sampled at the South Pole (1976, p.833-841) MP 931	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice [1975, p.363-372] De-icing using lasers [1976, 25p.] Roof response to icing conditions [1979, 40p.] CR 76-17 Lang, T.E. Constitutive relation for the deformation of snow (1981, p.3-14) Langleben, M.P. Comment on Water drag coefficient of first-year sea ice' by M.P. Langleben (1983, p.779-782) Langsten, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure [1977, 24p.] CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core (1971, p.17-22) MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] Cli and other isotope studies on natural ice [1972, p.170-D92] Polar ice-core storage facility [1976, p.71-75] Vanadium and other elements in Greenland ice cores [1976, 4p.] Seasonal variations of chemical constituents in annual layers of Greenland deep ice deposits [1977, p.302-306] Vanadium and other elements in Greenland ice cores [1976, p.81-102] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica [1977, p.322-325] MP 1092 Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica [1977, p.322-325] MP 1095 Interhemispheric comparison of changes in the composition of atmospheric precipitation during the Late Cenozoic era (1977, p.617-631) Amospheric trace metals and sulfate in the Greenland Ice Sheet (1977, p.915-920) Lapotta, P.J. Analysis of the Revere, Quincy and Stamford structure data bases for predicting building materials data base for New
lesberg thickness profiling [1978, p.766-774] MP 1019 Radar profile of a multi-year pressure ridge fragment [1978, p.59-62] MP 1126 Azial double point-load tests on snow and ice [1978, 11p.] CR 78-01 Radar anisotropy of see ice due to preferred azimuthal orientation of the horizontal c-axes of ice crystals [1978, p.171-201] MP 1113 Study of several pressure ridges and ice islands in the Canadian Beaufort Sea [1978, p.39-532] MP 1187 Sea ice pressure ridges in the Beaufort Sea [1978, p.249-271] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1205 Racent ice observations in the Alaskan Beaufort Sea federal-state lesse area [1978, p.7-12] MP 1205 Radar anisotropy of sea ice due to preferred azimuthal orientation of horizontal c-axes of ice crystals [1978, p.6037-6046] Measurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971) [1978, p.148-172] MP 1179 Remote detection of water under ice-covered lakes on the North Slope of Alaska [1978, p.448-458] MP 1214 Remote detection of massive ice in permafrost along the Alyeska pipeline and the pump station feeder gas pipeline (1979, p.268-279) Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska [1979, p.161-164] MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.127-146) MP 1230 Multi year pressure ridges in the Canadian Beaufort Sea (1979, p.174-126) MP 1230 Milti year pressure ridges in the Canadian Beaufort Sea (1979, p.549-5759) MP 1239 Oli pooling under sea ice [1979, p.181-207) Anisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.324-353) MP 1239 Anisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.324-353) MP 1239 Subsurface measurements of McMurdo Ice Shelf [1979, p.79-80] Shore ice pile-up and ride-up: field observations, models, theoretical analyses [1980, p.209-298] MP 1239 Investigations of sea ice anisotropy, ele	Measuring multi-year sea ice thickness using impulse radar (1985, p.55-67) MP 1916 Analysis of wide-angle reflection and refraction measurements (1985, p.53-60) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1953 Impulse radar sounding of frozen ground (1985, p.28-40) MP 1952 Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902 Apparent unconfined compressive strength of multi-year sea ice (1985, p.151-167) Apparent unconfined compressive strength of multi-year sea ice (1985, p.101-115) MP 1900 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) CR 85-13 Electromagnetic measurements of multi-year sea ice using impulse radar (1985, 26p.) MP 2020 Kreig, R.A. Guidebook to permafrost and related features along the Elliott and Dalton Highways, Fox to Prudhoe Bay, Alaska (1983, 230p.) MP 1640 Terrain analysis from space shuttle photographs of Tibet (1986, p.400-409) MP 2097 Krah, G. Soil microbiology (1981, p.38-44) MP 1753 Kagzrak, F.E. Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) MP 1379 Kusha, P.M. Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1032 Kutwaea, K.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1032 Kutwaea, K.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1032 Kutwaea, K.C. South Pole ice core drilling, 1981-1982 (1982, p.89-91) MP 1621 Lee drilling technology (1984, 142p.) SR 84-34 Kulla, J.B. Oxygen isotope investigation of the origin of the basal zone of the Matanuska Glacier, Alaska (1978, p.673-685) MP 1379 Kumai, M. Identification of nuclei and concentrations of chemical species in anow crystals sampled at the South Pole (1976, p.833-841) MP 853 Examining antarctic soils with a scanning electron micro-	loe gouge hazard analysis (1986, p.57-66) Lane, J.W. Optical properties of sait ice [1975, p.363-372] MP 854 De-icing using lasers [1976, 25p.] Roof response to icing conditions [1979, 40p.] CR 76-10 Roof response to icing conditions [1979, 40p.] CR 79-17 Lang, T.E. Constitutive relation for the deformation of snow [1981, p.3-14] Langleben, M.P. Comment on Water drag coefficient of first-year sea ice' by M.P. Langleben [1983, p.779-782] MP 1577 Langstea, D. Growth history of lake ice in relation to its stratigraphic, crystalline and mechanical structure [1977, 24p.] CR 77-01 Langway, C.C., Jr. Climatic oscillations depicted and predicted by isotope analyses of a Greenland ice core [1971, p.17-22] MP 998 Oxygen isotope profiles through the Antarctic and Greenland ice sheets [1972, p.429-434] Cli 4 and other isotope atudies on natural ice [1972, p.170-D92] Polar ice-core storage facility [1976, p.71-75] Vanadium and other elements in Greenland ice cores [1976, 4p.] Seasonal variations of chemical constituents in annual layer of Greenland deep ice deposits [1977, p.302-306, MP 1094 Vanadium and other elements in Greenland ice corea [1976, p.98-102] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica [1977, p.322-325] MP 1098 Interhemispheric comparison of changes in the composition of atmospheric precipitation during the Late Cenozoic era [1977, p.617-631] Amongham and Stamford structure data bases for predicting building material distribution [1985, 35p.] Description of the building materials data base for New Haven, Connecticut [1985, 129p.] SR 85-07 Regression models for predicting building material distribution distribution models for predicting building material distribution distribution distribution flows.

Lersen, E.T. Observation and analysis of protected membrane roofing sys-	Lee, H.J. Geotechnical properties and freeze/thaw consolidation	Lewellen, R.I. Operational report: 1976 USACRREL-USGS subsea persa.
tems (1977, 40p.) CR 77-11 Lersen, R.E.	behavior of sediment from the Beaufort Sea, Alaska (1985, 83p.) MP 2025	frost program Beaufort Sea, Alaska [1976, 20p.] SR 76-1
Rugineering aspects of an experimental system for land renovation of secondary effluent [1978, 26p.] SR 78-23	Lee, M. Ice releasing block-copolymer coatings [1978, p.544-551]	1977 CRREL-USGS permafrost program Beaufort Sea, Alaka, operational report [1977, 19p.] SR 77-4
Larson, R.W. 100 MHz dielectric constant measurements of anow cover:	MP 1141 Leggett, D.C.	Field methods and preliminary results from subses permafro investigations in the Beaufort Ses, Alaska (1979, p.207.
dependence on environmental and snow pack parameters [1985, p.829-834] MP 1913	Effect of sediment organic matter on migration of various chemical constituents during disposal of dredged material	213 ₁ MP 199 Buried valleys as a possible determinant of the distribution of
Lerson, W.E.	[1976, 183p.] MP 967	deeply buried permafrost on the continental shelf of the Beaufort Sea (1979, p.135-141) MP 126
Uptake of nutrients by plants irrigated with municipal was- tewater effluent (1978, p.395-404) MP 1151	Wastewater renovation by a prototype alow infiltration land treatment system [1976, 44p.] CR 76-19	Linden, D.R.
Engineering aspects of an experimental system for land reno-	Reclamation of wastewater by application on land (1976, 15p.) MP 896	Uptake of nutrients by plants irrigated with municipal was tewater effluent [1978, p.395-404] MP 115
vation of secondary effluent [1978, 26p.] SR 78-23 Lawson, D.E.	Vapor pressure of 2,4,6-trinitrotoluene by a gas chromato-	Engineering aspects of an experimental system for land rene vation of secondary effluent (1978, 26p.) SR 78-2
Oxygen isotope investigation of the origin of the basal zone of the Matanuska Glacier, Alaska (1978, p.673-685) MP 1177	graphic headspace technique [1977, p.83-90] MP 915 Composition of vapors evolved from military TNT as in- fluenced by temperature, solid composition, age and source	Lindsay, R.W. Turbulent heat flux from Arctic leads [1979, p.57-91]
Human-induced thermokarst at old drill sites in northern	[1977, 25p.] SR 77-16 Determination of 2,4,6-trinitrotoluene in water by conversion	Linell, K.A.
Alaska [1978, p.16-23] MP 1254 Tundra disturbances and recovery following the 1949 ex-	to nitrate [1977, p.880] MIP 980	Some experiences with tunnel entrances in permatro [1978, p.813-819] MP 116
ploratory drilling, Fish Creek, Northern Alaska 1978, 81p.; CR 78-28	Evaluation of existing systems for land treatment of wastewa- ter at Manteca, California, and Quincy, Washington 1977,	Design and construction of foundations in areas of deep ser
Sedimentological analysis of the western terminus region of the Matanuska Glacier, Alaska [1979, 112p.]	34p.j CR 77-24 Wastewater treatment alternative needed [1977, p.82-87]	sonal frost and permafrost (1980, 310p.) SR 80-3 Design of foundations in areas of significant frost penetratio
CR 79-09	MP 368 Determination of dissolved nitrogen and oxygen in water by	(1980, p.118-184) MP 135 Ling, C.H.
Comparison of the pebble orientation in ice and deposits of the Matanuska Glacier, Alaska [1979, p.629-645]	headspace gas chromatography [1979, 5p.] SR 79-24	Continuum sea ice model for a global climate model [1980]
MP 1276 Environmental analysis of the Upper Susitna River Basin	Improved enzyme kinetic model for nitrification in soils amended with ammonium. 1. Literature review 1980,	p.187-196 ₁ MP 162 Linkins, A.E.
using Landsat imagery [1980, 41p.] CR 30-04	20p. ₁ CR 80-01 Removal of volatile trace organics from wastewater by over-	Sensitivity of plant communities and soil flore to seawate spills, Prudhoe Bay, Alaska [1983, 35p.] CR 83-2
Drilling and coring of frozen ground in northern Alaska, Spring 1979 [1980, 14p.] SR 80-12	land flow land treatment [1980, p.211-224] MP 1313 Toxic volatile organics removal by overland flow land treat-	Reconnaissance observations of long-term natural vegetation
Distinguishing characteristics of diamictons at the margin of the Matanuska Glacier, Alaska [1981, p.78-84]	ment [1981, 14p.] MP 1421	recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora [1985, 75p.] CR 85-1
MP 1462	Overland flow: removal of toxic volatile organics [1981, 16p.] SR 81-01	Liston, N. Mobility bibliography [1981, 313p.] SR 81-3
Sedimentological characteristics and classification of deposi- tional processes and deposits in the glacial environment	Identifying and determining halocarbons in water using gas chromatography [1981, 13p.] SR \$1-26	U.S. tundra biome publication list (1983, 29p.)
[1981, 16p.] CR 81-27 Mobilization, movement and deposition of active subscrial	Effect of soil temperature and pH on nitrification kinetics in	SR 83-2 Topical databases: Cold Regions Technology on-line [1985]
sediment flows, Matanuska Glacier, Alaska [1982, p.279-	soils receiving a low level of ammonium enrichment [1981, 27p.] SR 81-33	p.12-15; MP 202 Liston, R.A.
Long-term modifications of perennially frozen sediment and	Assessment of the treatability of toxic organics by overland flow [1983, 47p.] CR 83-03	Air cushion vehicle ground contact directional control de
terrain at East Oumalik, northern Alaska [1982, 33p.; CR 82-36	Reverse phase HPLC method for analysis of TNT, RDX,	vices [1976, 15p.] CR 76-4 Radial tire demonstration [1985, p.281-285] MP 218
Ground ice in perennially frozen sediments, northern Alaska 1983, p.695-7001 MP 1661	HMX and 2,4-DNT in munitions wastewater [1984, 95p.] CR 84-29	Lohecz, E.F. Storm drainage design considerations in cold regions [1978]
Erosion of perennially frozen streambanks [1983, 22p.]	Toxic organics removal kinetics in overland flow land treat- ment [1985, p.707-718] MP 2111	p.474-489 ₁ MP 100
CR 83-29 Prototype drill for core sampling fine-grained perennially	TATE DOV and UMV analysis in sails and andimontal	Some experiences with tunnel entrances in permafror [1978, p.813-819] MP 116
frozen ground [1985, 29p.] CR 85-01	Analysis techniques and drying losses [1985, 11p.] CR 85-15	Design and construction of foundations in areas of deep set sonal frost and permafrost (1980, 310p.) SR 80-3
Erosion of northern reservoir shores. An analysis and application of pertinent literature [1985, 1989.]	Sorption of military explosive contaminants on bentonite drilling muds (1985, 33p.) CR 85-18	Design of foundations in areas of significant frost penetratio
M 85-01 Pebble fabric in an ice-rafted diamicton [1985, p.577-591]	Comparison of extraction techniques and solvents for explosive residues in soil (1985, 33p.) SR 85-22	[1980, p.118-184] MP 135 Surface drainage design for airfields and heliports in arcti
MP 1959	Reversed-phase high-performance liquid chromatographic	and subarctic regions [1981, 56p.] SR 81-2 Lockr, R.
Frazil ice pebbles: frazil ice aggregates in the Tanana River near Fairbanks, Alaska (1986, p.475-483) MP 2130	determination of nitroorganics in munitions wastewater (1986, p.170-175) MP 2049	Engineering systems [1983, p.409-417] MP 194
Sub-ice channels and longitudinal frazil bars, ice-covered Tanana River, Alaska [1986, p.465-474] MP 2129	Effect and disposition of TNT in a terrestrial plant [1986, p.49-52] MP 2098	Leehr, R.C. Site selection methodology for the land treatment of wastewn
Layman, R.W.	LeMasurier, W.E.	ter (1981, 74p.) SR 81-1
Development of a simplified method for field monitoring of soil moisture (1978, p.40-44) MP 1194	Marie Byrd Land quaternary volcanism: Byrd ice core cor- relations and possible climatic influences [1972, p.139-	Long, S.E. Analysis of diffusion wave flow routing model with applications.
Remote sensing of water quality using an airborne spectroradiometer [1980, p.1353-1362] MP 1491	141 ₁ MP 994 Lemieux, G.	tion to flow in tailwaters [1983, 31p.] CE 83-4 Modeling rapidly varied flow in tailwaters [1984, p.271-
Water quality monitoring using an airborne spectroradiome-	Compression of wet snow [1978, 17p.] CR 78-18	289 ₁ NP 171 Lonedale, H.K.
ter [1984, p.353-360] MP 1718 Ledbetter, C.B.	Laboratory experiments on icing of rotating blades [1979, p.85-92] MP 1236	Towing icebergs [1974, p.2] MIP 102
Temporary environment. Cold regions habitability [1976, 162p.] SR 76-10	Lemieux, G.E. Experimental investigation of potential icing of the space	Low, P.F. Isothermal compressibility of water mixed with Na-saturate
Notes on conducting the behavior setting survey by interview	shuttle external tank [1982, 305p.] CR 82-25	Isothermal compressibility of water mixed with Na-saturate montmorillonite [1983, p.45-50] MP 266 Lowman, R.A.
method [1976, 33p.] SR 76-14 Energy conservation in buildings [1976, 8p.] SR 76-17	Studies of high-speed rotor icing under natural conditions (1983, p.117-123) MP 1635	Lowman, R.A. Direct filtration of streamborne glacial silt (1982, 17p.) CR 82-3
Guidelines for architectural programming of office settings	Unsteady river flow beneath an ice cover (1983, p.254-260) MP 2679	CR 82-2 Losowski, E.P.
[1977, 14p.] SR 77-05 Collaboration of architect and behavioral scientist in research	Ice accretion under natural and laboratory conditions (1985, p.225-228) MP 2009	Computer modeling of time-dependent rime icing in the a mosphere [1983, "4p.] CR 83-6
[1977, 8p.] CR 77-23 Small communities result in greater satisfaction; an examina-	Leppitranta, M.	Lakow, T.E.
tion of undermanning theory [1977, 15p.] SR 77-36	Ice properties in the Greenland and Barents Seas during summer [1983, p.142-164] MP 2062	Propane dispenser for cold fog dissipation system 1973, 38p. ₁ NP 103
Architectural programming: Making socially responsive architecture more accessible [1978, 7p.] SR 78-02	Size and shape of ice flora in the Baltic Sea in spring [1983, p.127-136] MP 2061	
Communication in the work place: an ecological perspective [1979, 19p.] SR 79-03	Growth model for black ice, snow ice and snow thickness in	Lunardial, V.J. Neumann solution applied to soil systems [1980, 7p.] CR 80-1
Post occupancy evaluation of a planned community in Arctic	subarctic basins [1983, p.59-70] MP 2063 On the role of ice interaction in marginal ice zone dynamics	Phase change around a circular pipe [1980, 18p.] CR 88-2
Canada (1980, 27p.) SR 80-06 Post occupancy evaluation of a remote Australian communi-	(1984, p.23-29) MP 1781 Mechanism for floe clustering in the marginal ice zone	Heat transfer in cold climates [1981, 731p.] MP 143
ty: Shay Gap, Auatralia [1980, 57p.] SR 80-29 Lee, C.L.	[1984, p.73-76] MIP 1785	Approximate solution to Neumann problem for soil system [1981, p.76-81] MP 149
Laboratory investigation of the mechanics and hydraulics of	Analysis of linear sea ice models with an ice margin (1984, p.31-36) MP 1782	Cylindrical phase change approximation with effective the mal diffusivity (1981, p.147-154) MIP 143
river ice jams (1976, 97p.; MP 1060 Laboratory investigation of the mechanics and hydraulics of	On the rhoology of a broken ice field due to fice collision [1984, p.29-34] MP 1812	Effects of ice on coal movement via the inland waterway [1991, 72p.] SE 81-1
river ice jams [1977, 45p.] CR 77-09	MIZEX 83 mesoscale sea ice dynamics: initial analysis	Phase change around a circular cylinder (1981, p.598-600)
Lee, C.R. Toxic volatile organics removal by overland flow land treat-	[1984, p.19-28] MP 1811 MIZEX 84 mesoscale sea ice dynamics: post operations re-	MP 156 Mine/countermine problems during winter warfare. Fin
ment (1981, 14p.) MP 1421 Overland flow: an alternative for wastewater treatment	port (1984, p.66-69) MP 1257 Role of plastic ice interaction in marginal ice zone dynamics	report of a workshop [1981, 43p.] SR 81-2 Phase change around insulated buried pipes: quasi-stead
[1982, p.181-184] MP 1506	[1985, p.11,899-11,909] MP 1544	method [1981, p.201-207] MP 141

Application of the heat balance integral to conduction phase change problems [1981, 14p.) CR 81-25 Preezing of soil with surface convection [1982, p.205-212]	Detecting structural heat losses with mobile infrared thermography. Part 4: Estimating quantitative heat loss at Dartmouth College, Hanover, New Hampshire (1976, 9p.)	Analysis of velocity profiles under ice in shallow streams [1981, p.94-111] MP 1397 Method for measuring brash ice thickness with impulse radar
MP 1595 Mobility of water in frozen soils [1982, c15p.]	Photomacrography of artifacts in transparent materials [1976, 31p.] CR 76-40	[1981, 10p.] SR 81-11 Resistance coefficients from velocity profiles in ice-covered
MP 2012 Conduction phase change beneath insulated heated or cooled structures [1982, 40p.]	Infrared thermography of buildings: an annotated bibliography (1977, 21p.) SR 77-09	ahallow streams [1982, p.236-247] MP 1540 Determining the characteristic length of floating ice sheets by moving loads [1985, p.155-159] MP 1885
Approximate phase change solutions for insulated buried cyl- inders [1983, p.25-32] MP 1993	Infrared thermography of buildings: Qualitative analysis of five buildings at Rickenbacker Air Force Base, Columbus, Ohio [1977, 21p.] SR 77-26	Marzhanian, P.C. Structural evaluation of porous pavement test sections at Walden Pond State Reservation, Concord, Massachusetts
Proceedings [1983, 813p.] MP 1581 Preezing of semi-infinite medium with initial temperature gradient [1983, p.649-652] MP 1583	Infrared thermography of buildings: qualitative analysis of window infiltration loss, Federal Office Building, Burling-	(1980, 43p.; SR 80-39 Matlock, C.S.
Freezing and thawing: heat balance integral approximations (1983, p.30-37) MP 1597	ton, Vermont [1977, 17p.] SR 77-29 Comparative testing system of the applicability for various thermal scanning systems for detecting heat losses in build-	Piles in permafrost for bridge foundations (1967, 41p.) MP 1411 May, T.A.
Approximate solution to conduction freezing with density variation [1983, p.43-45] MP 1598 Thawing beneath insulated structures on permafrost [1983,	ings [1978, p.B71-B90] MP 1212 Infrared thermography of suildings—a bibliography with abstracts [1979, 67p.] SR 79-01	Climatic and soil temperature observations at Atkasook on the Meade River, Alaska, summer 1975 [1976, 25p.]
p.750-755 ₁ MP 1662 Proceedings (1984, 3 vols.) MP 1675	Infrared thermography of buildings: 1977 Coast Guard survey [1979, 40p.] SR 79-20	SR 76-01 Maykut, G.A. On the decay and retreat of the ice cover in the summer MIZ
Freezing of a semi-infinite medium with initial temperature gradient [1984, p.103-106] MP 1740 Freezing of soil with phase change occurring over a finite	Roof reaponse to icing conditions [1979, 40p.] CR 79-17 Measuring building R-values for large areas [1981, p.137-	[1984, p.13-22] MP 1780 McCabe, E.Y.
temperature zone [1985, p.38-46] MP 1854 Proceedings [1985, 2 vols.] MP 2105	138 ₁ MP 1388 Thermal patterns in ice under dynamic loading [1983, p.240-	Soil freezing response: influence of test conditions ;1985, p.49-58, MP 1990 McCown, B.H.
Review of analytical methods for ground thermal regime cal- culations [1985, p.204-257] MP 1922 Free and forced convection heat transfer in water over a melt-	243 ₁ MP 1742 Toward in-situ building R-value measurement [1984, 13p.] CR 84-01	Seasonal cycles and relative levels of organic plant nutrients under Arctic and alpine conditions [1971, p.55-57] MP 904
ing horizontal ice sheet [1986, p.227-236] MP 2033 Experimental determination of heat transfer coefficients in water flowing over a horizontal ice sheet [1986, 81p.] CR 86-03	Thermal (2-5.6 micron) emittance of diathermanous materials as a function of optical depth, critical angle and temperature [1984, p.209-220] MP 1863 Time-lapse thermography: a unique electronic imaging ap-	Ecological effects of oil spills and seepages in cold-dominated environments (1971, p.61-65) MP 905 Comparative investigation of periodic trends in carbohydrate
Lynch, D.R.	plication (1984, p.84-88) MP 2103	and lipid levels in Arctic and alpine plants (1972, p.40-45) MP 1376
Continuously deforming finite elements for the solution of parabolic problems, with and without phase change [1981, p.81-96] MP 1493	Emittance: a little understood image deception in thermal imaging applications [1985, p.72-78] MP 1962 Thermal emissivity of diathermanous materials [1985,	Fate and effects of crude oil spilled on permafrost terrain. Second annual progress report, June 1976 to July 1977 (1977, 46p.) SR 77-44
Optimization model for land treatment planning, design and operation. Part 2. Case study [1983, 30p.] SR 83-07	p.872-878 ₁ MP 1963 Martel, C.J.	McDade, C. Dynamics of NH4 and NO3 in cropped soils irrigated with
Optimization model for land treatment planning, design and operation. Part 3. Model description and user's guide	Performance of overland flow land treatment in cold climates [1978, p.61-70] MP 1152	wastewater (1980, 20p.) SR 80-27 Corps of Engineers land treatment of wastewater research
[1983, 38p.] SR 83-08 Optimization model for land treatment planning, design and	International and national developments in land treatment of wastewater (1979, 28p.) MP 1420	program: an annotated bibliography [1983, 82p.] SR 83-09
operation. Part 1. Background and literature review (1983, 35p.) SR 83-06	Land treatment systems and the environment [1979, p.201- 225] MP 1414	McDaniel, J. Comparative near-millimeter wave propagation properties of
Finite element simulation of ice crystal growth in subcooled sodium-chloride solutions [1985, p.527-532] MP 2106	Pilot scale study of overland flow land treatment in cold cli- mates [1979, p.207-214] MP 1279	snow or rain [1983, p.115-129] MP 1690 McFaddon, T.
Economics of ground freezing for management of uncon-	Wastewater treatment in cold regions by overland flow [1980, 14p.] CR 80-07	Radiation and evaporation heat loss during ice fog conditions [1975, p.18-27] MP 1051
Milittimen, M.	Removal of volatile trace organics from wastewater by over- land flow land treatment [1980, p.211-224] MP 1313	Thermal pollution studies of French Creek, Eielson AFB, Alasks [1976, 5p.] CR 76-14
Vibrations caused by ship traffic on an ice-covered waterway [1981, 27p.] CR 81-05	Removal of organics by overland flow [1980, 9p.] MP 1362	Debris of the Chena River [1976, 14p.] CR 76-26 Failure of an ice bridge [1976, 13p.] CR 76-29
Dynamic ice-structure interaction analysis for narrow vertical structures (1981, p.472-479) MP 1456	Forage grass growth on overland flow systems (1980, p.347- 354) MP 1402	Suppression of ice fog from cooling ponds [1976, 78p.] CR 76-43
Dynamic ice-structure interaction during continuous crushing (1983, 48p.) CR 83-95	Rational design of overland flow systems [1980, p.114-121] MP 1400	Fate and effects of crude oil spilled on permafrost terrain. First year progress report [1976, 18p.] SR 76-15
Mackay, J.R. On the origin of pingos—a comment [1976, p.295-298] MP 916	Spray application of wastewater effluent in a cold climate: performance evaluation of a full-scale plant [1980, p.620- 626] MP 1403	Utility distribution systems in Sweden, Finland, Norway and England (1976, 121p.) SR 76-16 Freeze damage prevention in utility distribution lines (1977,
MacLean, S.F., Jr.	Toxic volatile organics removal by overland flow land treat-	p.221-231 ₁ MP 929
Barrow, Alaska, USA [1975, p.73-124] MP 1050 Coastal tundra at Barrow [1980, p.1-29] MP 1356	ment (1981, 14p.) MIP 1421 Overland flow: removal of toxic volatile organics (1981,	Utility distribution practices in northern Europe (1977, p.70- 95) MP 928
Madore, K. Disinfection of wastewater by microwaves [1980, 15p.]	l6p.; SR 81-01 Development of a rational design procedure for overland flow	Yukon River breakup 1976 [1977, p.592-596] MP 960 Freeze damage protection for utility lines [1977, p.12-16]
SR 80-01 Makkonen, L.	systems [1982, 29p.] CR 82-02 Vegetation selection and management for overland flow sys-	MP 953 lee fog suppression using monomolecular films (1977, p.361-
Atmospheric icing on sea structures [1984, 92p.]	tems (1982, p.135-154) MP 1511 Overland flow: an alternative for wastewater treatment	367 ₁ MP 956 Ice breakup on the Chena River 1975 and 1976 (1977, 44p.)
Makshtas, A.P.	[1982, p.181-184] MP 1506 Evaluating the heat pump alternative for heating enclosed	CR 77-14 Investigation of slumping failure in an earth dam abutment at
Reports of the U.SU.S.S.R. Weddell Polynya Expedition, October-November 1981 Volume 7: Surface-level meteoro-	wastewater treatment facilities in cold regions 11982, 23p.; SR 62-10	Kotzebue, Alaska [1977, 21p.] SR 77-21 Fate and effects of crude oil spilled on permafrost terrain.
logical data (1983, 32p.) SR 83-14 Energy exchange over antarctic sea ice in the spring (1985,	Heating enclosed wastewater treatment facilities with heat	Second annual progress report, June 1976 to July 1977 [1977, 46p.] SR 77-44
p.7199-7212; MP 1889 Marlar, T.	Energy conservation at the West Dover, Vermont, water pol-	Fresh water supply for a village surrounded by salt water—Point Hope, Alaska [1978, 18p.] SR 78-07
Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery (1973, 5p.) MP 1611 Marker, T.L.	lution control facility [1982, 18p.] SR 82-24 Assessment of the treatability of toxic organics by overland flow [1983, 47p.] CR 83-03	Physical, chemical and biological effects of crude oil spills on black spruce forest, interior Alaska [1978, p.305-323] MP 1185
Arctic and Subarctic environmental analyses utilizing ERTS- 1 imagery; bimonthly progress report, 23 June - 23 Aug.	Heat recovery from primary effluent using heat pumps [1985, p.199-203] MP 1978	loe fog suppression using reinforced thin chemical films [1978, 23p.] CR 78-26
1972 (1972, 3p.) MP 991 Arctic and subarctic environmental analysia (1972, p.28-30) MP 1119	Marten, G.C. Uptake of nutrients by plants irrigated with municipal wastewater effluent (1978, p.395-404) MP 1151	Ice fog suppression using thin chemical films [1979, 44p.] MP 1192
Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Bimonthly progress report, 23 Aug 23 Oct.	Martin, R.J., III Mechanisms of crack growth in quartz (1975, p.4837-4844)	lce forces on the Yukon River bridge—1978 breakup (1979, 40p.) MP 1384 Case study: fresh water supply for Point Hope, Alaska (1979,
1973 (1973, 3p.) MP 1030 Arctic and subarctic environmental analyses utilizing ERTS-	Martin, R.T.	p.1029-1040; MP 1222 Fate and effects of crude oil spilled on subarctic permafrost
l imagery. Bimonthly progress report, 23 Oct 23 Dec. 1973 (1973, 6p.) Arctic and subarctic environmental analysis utilizing ERTS-	Mechanical properties of polycrystalline ice: an assessment of current knowledge and priorities for research (1979, 16p.) MP 1207	terrain in interior Alaska (1980, 128p.) MP 1310 Waste heat utilization through soil heating (1980, p. 105- 120) MP 1363
1 imagery. Final report June 1972-Feb. 1974 (1974, 128p.) MP 1047	Application of the Andrade equation to creep data for ice and frozen soil [1979, p.29-36] MP 1802	Fate and effects of crude oil spilled on subarctic permafrost terrain in interior Alaska [1980, 67p.] CR 80-29
Remote sensing of land use and water quality relationships— Wisconsin shore, Lake Michigan (1976, 47p.)	Martin, S. MIZEX—a program for mesoscale air-ice-ocean interaction;	loe fog suppression in Arctic communities (1980, p.54-65) MP 1357
CR 76-30 Analysis of potential ice jam sites on the Connecticut River at Windsor, Vermont [1976, 31p.] CR 76-31	experiments in Arctic marginal ice zones. 1. Research strategy [1981, 20p.] SR 81-19 Martinson, C.R.	Ice force measurement on the Yukon River bridge [1981, p.749-777] MP 1396 McGaw, R.
Marshall, S.J. De-icing using lasers [1976, 25p.] CR 76-10	Sediment displacement in the Ottauquechee River—1975- 1978 [1980, 14p.] SR 80-20	Proposed size classification for the texture of frozen earth materials [1975, 10p.] MP 921

	•	
McGew, R. (cont.)	Bacterial aerosols from a field source during multiple-sprin-	Meals, D.W.
Simple procedure to calculate the volume of water remaining	kler irrigation: Deer Creek Lake State Park, Ohio 1979,	Spray application of wastewater effluent in West Dover, Ver-
unfrozen in a freezing soil [1976, p.114-122] MIP 899	64p. ₁ SR 79-32	mont: an initial assessment [1979, 38p.] SR 79-06
Development of a remote-reading tensiometer/transducer	Survey of methods for soil moisture determination [1979, 74p.] MP 1639	Spray application of wastewater effluent in a cold climate:
system for use in subfreezing temperatures [1976, p.31-45] MP 897	Environmental analysis of the Upper Susitna River Basin	performance evaluation of a full-scale plant [1980, p.620- 626] MP 1463
Periodic structure of New Hampshire silt in open-system	using Landset imagery (1980, 41p.) CR 80-04	Case study of land treatment in a cold climate-West Dover,
freezing (1977, p.129-136) MP 902	Materials availability study of the Dickey-Lincoln dam site	Vermont [1982, 96p.] CR 82-44
Improved drainage and frost action criteria for New Jersey	[1980, p.158-170] MIP 1316	Mehran, M.
pavement design. Phase 2: Frost action [1978, 80p.] SE 78-09	Remote sensing of water quality using an airborne spectroradiometer (1980, p.1353-1362) MP 1491	Evaluation of a compartmental model for prediction of ni-
Thermal properties and regime of wet tundra soils at Barrow,	troradiometer (1980, p.1353-1362) MP 1491 Review of techniques for measuring soil moisture in situ	trate leaching losses [1981, 24p.] CR 81-23 Mathematical simulation of nitrogen interactions in soils
Alaska (1978, p.47-53) MP 1096	[1980, 17p.] SR 80-31	(1983, p.241-248) MP 2851
Mobility of water in frozen soils (1982, c15p.)	Infiltration characteristics of soils at Apple Valley, Minn.;	Meler, M.F.
MP 2012	Clarence Cannon Dam, Mo; and Deer Creek Lake, Ohio, land treatment sites (1980, 41p.) SR 80-36	Mechanical properties of polycrystalline ice: an assessment of
Investigation of transient processes in an advancing zone of freezing (1983, p.821-825) MP 1663	land treatment sites [1980, 41p.] SR 80-36 Hydraulic characteristics of the Deer Creek Lake land treat-	current knowledge and priorities for research (1979, 16p.)
freezing [1983, p.821-825] MP 1663 Pull-cycle heating and cooling probe method for measuring	ment site during wastewater application [1981, 37p.]	MP 1207
thermal conductivity (1984, 8p.) MP 1891	CR 81-07	Melmen, J.R. Spread of cetyl-1-C14 alcohol on a melting snow surface
McGrew, S.G.	Wastewater applications in forest ecosystems [1982, 22p.]	[1966, p.5-8] MIP 876
Dielectric properties at 4.75 GHz of saline ice slabs (1985,	CR 82-19	Meller, M.
p.83-86 ₁ MP 1911	Microbiological aerosols from a field-source wastewater irrigation system [1983, p.ε.3-75] MP 1578	Investigation of ice islands in Babbage Bight [1971, 46
McKim, H.L. Applie and subscript environmental analysis -1972 n 28.	Extraction of topography from side-looking satellite systems	leaves; MP 1381
Arctic and subarctic environmental analysis [1972, p.28-30] MP 1119	-a case study with SPOT simulation data [1983, p.535-	Cutting ice with high pressure water jets (1973, 22p.) MP 1001
Arctic and subarctic environmental analyses using ERTS-1	550 ₁ MP 1695	Snow accumulation for arctic freshwater supplies [1975,
imagery. Progress report Dec. 72-June 73 [1973, 75p.]	Landsat-4 thematic mapper (TM) for cold environments [1983, p.179-186] MP 1651	p.218-224 ₁ MP 860
MP 1003	Use of radio frequency sensor for snow/soil moisture water	General considerations for drill system design (1976, p.77-
Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery [1973, 5p.] MIP 1611	content measurement [1983, p.33-42] MP 1689	111 ₁ MP 856
Mesoscale deformation of sea ice from satellite imagery	Hydrologic forecasting using Landsat data (1983, p.159-	Mechanics of cutting and boring. Part II: Kinematics of axial rotation machines [1976, 45p.] CR 76-16
(1973, 2p.] MCP 1120	168 ₁ MP 1691	Mechanics of cutting and boring. Part III: Kinematics of
Arctic and subarctic environmental analyses utilizing ERTS-	Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model-	continuous belt machines [1976, 24p.] CR 76-17
1 imagery. Bimonthly progress report, 23 Aug 23 Oct. 1973 [1973, 3p.] MP 1030	ing [1984, 19p.] SR 84-01	Investigation of water jets for lock wall deicing (1976,
Arctic and subarctic environmental analyses utilizing BRTS-	Water quality monitoring using an airborne spectroradiome-	p.G2/13-22 ₁ MP 865
1 imagery. Bimonthly progress report, 23 Oct 23 Dec.	ter [1984, p.353-360] MP 1718	Development of large ice saws [1976, 14p.] CR 76-47 lce and snow at high altitudes [1977, 10p.] MP 1121
1973 [1973, 6p.] MIP 1031	Using Landsat data for snow cover/vegetation mapping [1984, p.II(140)-II(144)] MP 1975	Ice and snow at high altitudes [1977, 10p.] MP 1121 Mechanics of cutting and boring. Part 4: Dynamics and en-
Arctic and subarctic environmental analysis utilizing ERTS-	USACRREL's snow, ice, and frozen ground research at the	ergetics of parallel motion tools [1977, 85p.]
1 imagery. Final report June 1972-Feb. 1974 (1974, 128p.) MP 1047	Sleepers River Research Watershed [1984, p.229-240]	CR 77-67
New England reservoir management: Land use/vegetation	MP 2071	Permafrost excavating attac at for heavy buildozers
mapping in reservoir management (Merrimack River basin)	Ohio River main stem study: the role of geographic informa-	[1977, p.144-151] MIP 955 Engineering properties of snow [1977, p.15-66]
[1974, 30p.] MIP 1039	tion systems and remote sensing in flood damage assessments (1984, p.265-281) MP 2083	MP 1015
Near real time hydrologic data acquisition utilizing the LANDSAT system (1975, p.200-211) MIP 1855	Potential use of SPOT HRV imagery for analysis of coastal	Measuring the uniaxial compressive strength of ice [1977,
Islands of grounded ice [1975, p.213-216] MP 852	sediment plumes [1984, p.199-204] MIP 1744	p.213-223 ₁ MP 1027
	Spatial analysis in recreation resource management for the	Mechanics of cutting and boring. Part 6: Dynamics and en-
Applications of remote sensing for Corps of Engineers programs in New England [1975, 8p. + 14 figs. and tables]	Berlin Lake Reservoir Project [1984, p.209-219] MP 2884	ergetics of transverse rotation machines (1977, 36p.) CR 77-19
MP 913	Use of remote sensing for the U.S. Army Corps of Engineers	Lock wall deicing with high velocity water jet at Soo Locks,
Wastewater reuse at Livermore, California [1976, p.511-531] MIP 870	dredging program (1985, p.1141-1150) MIP 1890	Mi [1977, p.23-35] MIP 973
Remote sensing of land use and water quality relationships	Catalog of Corps of Engineers structure inventories suitable	Obtaining fresh water from icebergs [1977, p.193]
Wisconsin shore, Lake Michigan [1976, 47p.]	for the acid precipitation-structure material study [1985,	MP 1117
CR 76-30	40p. ₁ SR 85-01 Evaluating trafficability [1985, p.474-475 ₁ MP 2023	Some elements of iceberg technology [1978, p.45-98] MP 1616
Development of a remote-reading tensiometer/transducer	Comparison of SPOT simulator data with Landsat MSS im-	Dynamics of snow avalanches [1978, p.753-792]
system for use in subfreezing temperatures [1976, p.31-45] MP 897	agery for delineating water masses in Delaware Bay, Broad-	MP 1070
Skylab imagery: Application to reservoir management in New	kill River, and adjacent wetlands [1985, p.1123-1129]	Destruction of ice islands with explosives (1978, p.753-765)
England [1976, 51p.] SR 76-07	MP 1969	MP 1618
Environmental analyses in the Kootenai River region, Mon-	Potential of remote sensing in the Corps of Engineers dredg- ing program (1985, 42p.) SR 85-20	Some elements of iceberg technology [1978, 31p.] CR 78-02
tana [1976, 53p.] SR 76-13	McLein, B.G.	Investigation of ice clogged channels in the St. Marys River
Preliminary analysis of water equivalent/snow characteristics using LANDSAT digital processing techniques (1977, 16	Waterproofing strain gages for low ambient temperatures	[1978, 73p.] MIP 1170
leaves MP 1113	[1978, 20p.] SR 78-15	Large mobile drilling rigs used along the Alaska pipeline
Applications of remote sensing in the Boston Urban Studies	McLenghlin, D.	[1978, 23p.] SR 78-04
Program, Parts I and II (1977, 36p.) CR 77-13	Methodology used in generation of snow load case histories [1977, p.163-174] MP 1143	Mechanics of cutting and boring. Part 8: Dynamics and energetics of continuous belt machines [1978, 24p.]
Wastewater reuse at Livermore, California [1977, p.511-531, MP 979	McNeill, D.	CR 78-11
Use of the Landsat data collection system and imagery in	In-situ measurements on the conductivity and surface imped-	Study of several pressure ridges and ice islands in the Canadi-
reservoir management and operation [1977, c150p.]	ance of sea-ice at VLF frequencies [1971, 19p. plus dia-	an Beaufort Sea [1978, p.519-532] MP 1187
MP 1114	grams; MP 1071	an Beaufort Sea [1978, p.519-532] MP 1187 Undersea pipelines and cables in polar waters [1978, 34p.] CR 78-22
Effect of inundation on vegetation at selected New England flood control reservoirs [1978, 13p.] MP 1169	McNeffl, J.D. Airborne E-phase resistivity surveys of permafrost - central	Mechanical properties of polycrystalline ice: an assessment of
flood control reservoirs [1978, 13p.] MP 1169 Use of remote sensing to quantify construction material and	Alaska and Mackenzie River areas (1974, p.67-71)	current knowledge and priorities for research [1979, 16p.]
to define geologic lineaments, Dickey-Lincoln School	MP 1046	MP 1207
Lakes Project, Maine [1978, 9 leaves] MP 1167	McPhoe, M.G.	Towing ships through ice-clogged channels by warping and kedging [1979, 21p.] CR 79-21
Computer processing of Landsat digital data and sensor inter-	Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model [1979, p.388-400]	The iceberg cometh [1979, p.66-75] MP 1365
face development for use in New England reservoir management [1978, 61p.] SR 78-06	MP 1198	Icebreaking concepts (1980, 18p.) SR 80-62
Water resources by satellite (1978, p.164-169)	Physical oceanography of the seasonal sea ice zone [1980,	Some aspects of Soviet trenching machines [1980, 13p.]
MP 1090	p.93-132 ₁ MP 1294	
Microbiological serosols from a field source during sprinkler	Study of oceanic boundary-layer characteristics including in-	High-force towing [1980, p.231-240] MP 1275
irrigation with wastewater [1978, p.273-280] MIP 1154	ertial oscillation at three drifting stations in the Arctic Ocean (1980, p.870-884) MP 1369	Mechanical properties of polycrystalline ice (1980, p.217- 245) MP 1302
Performance of overland flow land treatment in cold climates	Upper ocean temperature, salinity and density in the vicinity	Mechanical properties of polycrystalline ice: an assessment of
[1978, p.61-70] MP 1152	of arctic Drift Station FRAM 1, March to May 1979	current knowledge and priorities for research [1980, p.263-
Growth and nutrient uptake of forage grasses when receiving	[1981, 20p.] SR 81-05	275 ₁ MP 1320
various application rates of wastewater (1978, p. 157-163) MP 1153	See ice drag laws and simple boundary layer concepts, includ- ing application to rapid melting [1982, 17p.]	275 ₁ MP 1328 Ship resistance in thick brash ice [1980, p.305-321 ₃ MP 1329
Mass water balance during spray irrigation with westewater at	CR 82-04	Mechanics of cutting and boring. Part 5: Dynamics and
Deer Creek Lake land treatment site [1978, 43p.]	Using sea ice to measure vertical heat flux in the ocean	energetics of indentation tools (1980, 82p.) CR 88-21
SR 79-29	[1982, p.2071-2074] MP 1521	Cyclic loading and fatigue in ice [1981, p.41-53]
Development of a simplified method for field monitoring of	McQueency, D. Development of a simplified method for field monitoring of	MP 1371
soil moisture (1978, p.40-44) MP 1194 Snow cover mapping in northern Maine using LANDSAT	soil moisture [1978, p.40-44] MP 1194	Subsea trenching in the Arctic [1981, p.843-882] MP 1464
digital processing techniques (1979, p.197-198)	McRoberts, E.C.	
MP 1510	Design implications of subsoil thawing (1984, p.45-103)	Standardized testing methods for measuring mechanical properties of ice (1981, p.245-254) MP 1556
International and national developments in land treatment of	MP 1706	Subsea trenching in the Arctic [1981, 31p.] CR 81-17
wastewater [1979, 28p.] MP 1420 Land treatment systems and the environment [1979, p.201-	McWhinnie, M.A. Ross Ice Shelf Project environmental impact statement July,	Mechanics of cutting and boring. Part 7: Dynamics and en-
225 _] MP 1414	1974 [1978, p.7-36] MP 1075	ergetics of axial rotation machines [1981, 38p.] CR 81-26

Deformation and failure of ice under constant stress or con- stant strain-rate [1982, p.201-219] MP 1525	Hydrologic forecasting using Landsat data (1983, p.159- 168)	Application of removal and control methods. Section 1 Railways; Section 2: Highways; Section 3: Airports [1981,
Glacier mechanics [1982, p.455-474] MIP 1532 Breaking ice with explosives [1982, 64p.] CR 82-40	Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model-	p.671-706; MP 1447 Effects of ice on coal movement via the inland waterways
Stress/strain/time relations for ice under uniaxial compres-	ing (1984, 19p.) SR 84-01 Water quality monitoring using an airborne spectroradiome-	[1981, 72p.] SR 81-13 Optimizing deicing chemical application rates [1982, 55p.]
sion (1983, p.207-230) MP 1887 Protection of offshore arctic structures by explosives (1983,	ter (1984, p.353-360) MIP 1718	CR 82-16
p.310-322; MP 1605 Mechanical behavior of sea ice [1983, 105p.] M 83-1	Using Landsat data for snow cover/vegetation mapping [1984, p.II(140)-II(144)] MP 1975	Proceedings of the First International Workshop on Atmo- spheric Icing of Structures, 1-3 June 1982, Hanover, New
Snow concentration and effective air density during snow- falls 1983, p.505-507; MP 1769	Potential use of SPOT HRV imagery for analysis of coastal sediment plumes [1984, p.199-204] MP 1744	Hampshire (1983, 366p.) SR 83-17 How effective are icephobic coatings (1983, p.93-95)
Strain measurements on dumbbell specimens (1983, p.75-	Wildlife habitat mapping in Lac qui Parle, Minnesota [1984, p.205-208] MP 2085	MP 1634 Ice observation program on the semisubmersible drilling ves-
77 ₁ MP 1683 Mechanical properties of ice in the Arctic seas (1984, p.235-	Spatial analysis in recreation resource management for the Berlin Lake Reservoir Project [1984, p.209-219]	aci SEDCO 708 [1984, 14p.] SR 84-62
259; MP 1674 Summary of the strength and modulus of ice samples from	MP 2064	Assessment of ice accretion on offshore structures [1984, 12p.] SE 84-64
multi-year pressure ridges [1984, p.126-133] MP 1679	Ohio River main stem study: the role of geographic informa- tion systems and remote sensing in flood damage assess-	Strategies for winter maintenance of pavements and roadways [1984, p.155-167] MIP 1964
Mechanical properties of multi-year sea ice. Testing techniques [1984, 39p.] CR 84-06	ments [1984, p.265-281] MIP 2083 Use of remote sensing for the U.S. Army Corps of Engineers	Measurement of icing on offshore structures [1985, p.287- 292] MP 2016
Mechanical properties of multi-year sea ice. Phase 1: Test	dredging program (1985, p.1141-1150) MP 1890 Catalog of Corps of Engineers structure inventories suitable	Snow and ice prevention in the United States [1986, p.37-
results (1984, 105p.) CR 84-09 Icebreaking by gas blasting (1984, p.93-102) MP 1827	for the acid precipitation-structure material study [1985, 40p.] SE 85-01	42 ₁ MP 1874 MIZEX—a program for mesoscale air-ico-ocean interaction
4th report of working group on testing methods in ice [1984, p.1-41] MP 1886	Analysis of the Revere, Quincy and Stamford structure data	experiments in Arctic marginal ice souce. 4: Initial results and analysis from MIZEX 83
Shopper's guide to ice penetration [1984, p.1-35] MP 1992	bases for predicting building material distribution 1985, 35p.; SE 65-07	MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 4: Initial results
Penetration of shaped charges into ice (1984, p.137-148) MP 1995	Comparison of SPOT simulator data with Landsat MSS imagery for delineating water masses in Delaware Bay, Broad-	and analysis from MIZEX 83 [1984, 56p.] SR 84-28 Meck, S.J.
Ice penetration tests [1984, p.209-240] MP 1996	kill River, and adjacent wetlands (1985, p.1123-1129) MP 1969	Classification and variation of sea ice ridging in the Arctic
Summary of the strength and modulus of ice samples from multi-year pressure ridges (1985, p.93-98) MP 1848	Description of the building materials data base for New Haven, Connecticut [1985, 129p.] SE 85-19	besin [1974, p.127-146] MP 1922 20-yr oscillation in eastern North American temperature re-
Mechanical properties of multi-year sea ice. Phase 2: Test results [1985, 81p.] CR 85-16	Potential of remote sensing in the Corps of Engineers dredg- ing program [1985, 42p.] SR 85-26	cords [1976, p.484-486] MP 889 Geodetic positions of borehole sites of the Greenland Ice
Ice penetration tests [1985, p.223-236] MP 2014	Regression models for predicting building material distribu-	Sheet Program [1976, 7p.] CR 76-41
Blasting and blast effects in cold regions. Part 1: Air blast [1985, 62p.] SR 85-25	tion in four northeastern cities (1985, 50p.) SR \$5-24 Description of the building materials data base for Pittsburgh,	Topological properties of some trellis pattern channel net- works (1976, 54p.) CR 76-46
Ice-coring augers for shallow depth sampling [1985, 22p.] CR 85-21	Pennsylvania (1986, 87p.) SR 86-00 Metz, M.C.	Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.533-546] MP 1866
Merry, C.J. Correlation and quantification of airborne spectrometer data	Workshop on Permafrost Geophysics, Golden, Colorado, 23- 24 October 1984 (1985, 113p.) SR 85-65	Meeller, W.B. Prevention of freezing and other cold weather problems at
to turbidity measurements at Lake Powell, Utah (1970, p.1309-1316) MP 1271	Michitti, F.	wastewater treatment facilities [1985, 49p.] SR 85-11
New England reservoir management: Land use/vegetation	Unconfined compression tests on snow: a comparative study [1977, 27p.] SR 77-29	Mell, M. C-14 and other isotope studies on natural ice [1972, p.D70-
mapping in reservoir management (Merrimack River basin) [1974, 30p.] MP 1039	Middlebrooks, C.H. Energy requirements for small flow wastewater treatment sys-	D92 ₁ MP 1052 Mongoon, W.E.
Islands of grounded ice [1975, p.213-216] MP 852 Applications of remote sensing for Corps of Engineers pro-	tems [1979, 82p.] SR 79-67 Middlebrooks, E.J.	Engineer's pothole repair guide [1984, 12p.] TD 84-01
grams in New England (1975, 8p. + 14 figs. and tables) MP 913	Wastewater stabilization pond linings (1978, 116p.)	Montaive, A. Application of HBC-2 for ice-covered waterways [1982,
Skylab imagery: Application to reservoir management in New England [1976, 51p.] SR 76-07	SR 78-28 Energy requirements for small flow wastewater treatment sys-	p.241-248 ₁ MP 1575 Moore, H.E.
Environmental analyses in the Kootenai River region, Mon-	tems [1979, 82p.] SR 79-07 Energy and costs for agricultural reuse of wastewater [1980,	Excavation of frozen materials [1980, p.323-345] MP 1366
tana [1976, 53p.] SR 76-13 Preliminary analysis of water equivalent/snow characteristics	p.339-346; MP 1461 Lime stabilization and land disposal of cold region wastewater	Moore, J.
using LANDSAT digital processing techniques (1977, 16 leaves) MP 1113	lagoon sludge [1982, p.207-213] MP 1696	Comparison of thermal observations of Mount St. Helens before and during the first week of the initial 1980 eruption
Applications of remote sensing in the Boston Urban Studies Program, Parts I and II [1977, 36p.] CR 77-13	Accumulation, characterization, and stabilization of sludges for cold regions lagoons [1984, 40p.] SR 84-68	(1980, p.1526-1527; MP 1482 Moore, R.K.
Airborne spectroradiometer data compared with ground wa- ter-turbidity measurements at Lake Powell, Utah: correla-	Miller, M.S. Use of Landsat data for predicting snowmelt runoff in the	Surface-based scatterometer results of Arctic sea ice (1979, p.78-85) MP 1260
tion and quantification of data [1977, 38p.] SR 77-28 Use of the Landast data collection system and imagery in	upper Saint John River basin [1983, p.519-533] MP 1694	Merel-Seyteen, H.J.
reservoir management and operation t1977, c150p.1 MP 1114	Extraction of topography from side-looking satellite systems	Integral transform method for the linearized Boussinesq groundwater flow equation (1981, p.875-884)
Land treatment module of the CAPDET program [1977,	—a case study with SPOT simulation data (1983, p.535- 550) MIP 1695	MP 1470 Morey, R.M.
4p. ₁ MP 1112 Effect of inundation on vegetation at selected New England	Miller, P.C. Arctic ecosystem: the coastal tundra at Barrow, Alaska	Detection of moisture in construction materials [1977, 9p.] CR 77-25
flood control reservoirs (1978, 13p.) MP 1169 Use of remote sensing to quantify construction material and	(1980, 57[p.] MP 1355 Miller, R.D.	Radar anisotropy of sea ice due to preferred azimuthal orien-
to define geologic lineaments, Dickey-Lincoln School Lakes Project, Maine [1978, 9 leaves] MP 1167	Numerical solutions for rigid-ice model of secondary frost heave [1980, p.656-669] MIP 1454	tation of the horizontal c-axes of ice crystals [1978, p.171- 201] MCP 1111
Computer processing of Landsat digital data and sensor inter- face development for use in New England reservoir man-	Numerical solutions for a rigid-ice model of secondary frost	Radar anisotropy of sea ice due to preferred azimuthal orien- tation of horizontal c axes of ice crystals [1978, p.6037-
agement (1978, 61p.) SR 78-06	heave [1982, 11p.] CR 82-13 Exploration of a rigid ice model of frost heave [1985, p.281-	6046j MP 1139 Remote detection of massive ice in permafrost along the
Use of remote sensing techniques and other information acuroes in regional site selection of potential land treatment	296 ₁ MP 1880 Mines, S.E.	Alyeska pipeline and the pump station feeder gas pipeline [1979, p.268-279] MP 1175
areas [1978, p.107-119] MIP 1146 Computer procedure for comparison of land treatment and	Experimental investigation of potential icing of the space shuttle external tank (1982, 305p.) CR 82-25	Remote detection of a freshwater pool off the Sagavanirktok River delta, Alaska (1979, p.161-164) MP 1224
conventional treatment: preliminary designs, cost analysis and effluent quality predictions [1978, p.335-340]	Minek, L.D.	Anisotropic properties of sea ice in the 50- to 150-MHz range (1979, p.5749-5759)
MP 1155 Snow cover mapping in northern Maine using LANDSAT	Use of de-icing salt—possible environmental impact (1973, p.1-2) MP 1037	Anisotropic properties of sea ice in the 50-150 MHz range
digital processing techniques (1979, p.197-198) MP 1510	Winter maintenance research needs (1975, p.36-38) MP 950	(1979, p.324-353) MP 1620 Investigations of sea ice anisotropy, electromagnetic proper-
Environmental analysis of the Upper Susitna River Basin	lee accumulation on ocean structures [1977, 42p.] CR 77-17	ties, strength and under-ice current orientation (1980, p.109-153) MP 1323
Materials availability study of the Dickey-Lincoln dam site	Preeze-thaw tests of liquid deicing chemicals on selected pavement materials [1977, 16p.] CR 77-28	Investigations of sea ice anisotropy, electromagnetic proper-
t1980, p.158-170; MP 1316 Snowpack estimation in the St. John River basin t1980.	Current research on snow and ice removal in the United	ties, strength, and under-ice current orientation (1980, 18p.)
p.467-486 ₁ MP 1799 Remote sensing of water quality using an airborne spec-	States (1978, p.21-22) MP 1199 Systems study of snow removal (1979, p.220-225)	Pooling of oil under sea ice (1981, p.912-922) MP 1459
troradiometer [1980, p.1353-1362] MP 1491 Extraction of topography from side-looking satellite systems	MP 1237 Freezing and thawing tests of liquid deicing chemicals on	High-resolution impulse radar measurements for detecting sea ice and current alinement under the Ross Ice Shell
—a case study with SPOT simulation data [1983, p.535- 550] MP 1695	selected pavement materials [1979, p.51-58] MP 1220	[1981, p.96-97] MP 1843 Brine zone in the McMurdo Ice Shelf, Antarctica [1982,
Use of Landout data for predicting snowmelt runoff in the	Noncorrosive methods of ice control (1979, p.133-162) MP 1265	28p. ₁ CR 82-39
upper Seint John River basin [1983, p.519-533] MP 1694	Ice adhesion tests on coatings subjected to rain erosion	Effects of conductivity of high-resolution impulse radar sounding, Ross Ice Shelf, Antarctica [1982, 12p.] CR 82-42
Land treatment processes within CAPDET (Computer-assisted procedure for the design and evaluation of wastewater treatment systems), 1982, 70c.	[1980, 14p.] SR 80-28 leing on structures [1980, 18p.] CR 90-31 Snow remains equipment 1981 548 570.	CR 82-42 Detection of cavities under concrete pavement [1983, 41p.]
	NACH FEMANSI AMMAMANI AMELI - 440 470. NEW 4444	7th 44 14

Merey, R.M. (cont.) Blectromagnetic properties of sea ice [1984, 32p.] CR 84-02	Murramens, R.P. Trace gas analysis of Arctic and subarctic atmosphere (1971,	National Research Council. Ad Hoc Study Group on Ice Segregation and Frost Heaving
CR 84-02 Electromagnetic properties of sea ice (1984, p.53-75) MP 1776	p.199-203 _j MP 908 Land treatment of wastewater—case studies of existing dis- posal systems at Quincy, Washington and Manteca, Cali-	Ice segregation and frost heaving [1984, 72p.] MP 180 Nutional Research Council. Committee on Arctic Scaffoor
Authors' response to discussion on: Electromagnetic proper-	fornia [1976, 36p.] MP 920	Engineering
ties of sea ice (1984, p.95-97) MP 1822 Measuring multi-year sea ice thickness using impulse radar	Effect of sediment organic matter on migration of various chemical constituents during disposal of dredged material	Understanding the Arctic sea floor for engineering purpose [1982, 141p.] SR 83-2:
[1985, p.55-67] MP 1916 Analysis of wide-angle reflection and refraction measure-	[1976, 183p.] MP 967 Composition of vapors evolved from military TNT as in-	National Recearch Council. Polar Recearch Board. Committee on Permafreet
ments [1985, p.53-60] MP 1953	fluenced by temperature, solid composition, age and source [1977, 25p.] SR 77-16	Opportunities for permafrost-related research associated with the Trans-Alaska Pipeline System [1975, 37p.]
Impulse radar sounding of frozen ground [1985, p.28-40] MP 1952	Byaluation of existing systems for land treatment of wastewa- ter at Manteca, California, and Quincy, Washington (1977,	MP 112
Investigation of the electromagnetic properties of multi-year sea ice (1985, p.151-167) MP 1902	34p. ₁ CIR 77-24	Neave, K.G. Delineation and engineering characteristics of permafros
Electromagnetic measurements of multi-year sea ice using impulse radar [1985, 26p.] CR 85-13	Nadean, P.H. UV radiational effects on: Martian regolith water 1977,	beneath the Beaufort Sea (1979, p.93-115) MP 128 Delineation and engineering characteristics of permafros
Electromagnetic measurements of multi-year sea ice using	89p. ₁ MP 1072 Nakano, Y.	beneath the Beaufort Sea [1981, p.125-157] MP 142 Hyperbolic reflections on Beaufort Sea seismic record
Merris, C.E.	Prediction and validation of temperature in tundra soils [1971, p.193-197] MP 967	[1981, 16p.] CR 81-0:
Dependence of crushing specific energy on the aspect ratio and the structure velocity (1984, p.363-374)	Theory and numerical analysis of moving boundary problems	Delineation and engineering characteristics of permafros beneath the Beaufort Sea [1981, p.137-156] MP 160
MP 1708 Crushing ice forces on cylindrical structures [1984, p.1-9]	in the hydro-dynamics of porous media [1978, p.125-134] MP 1343	Subsea permafrost in Harrison Bay, Alaska: an interpretation from seismic data [1982, 62p.] CR 82-2
MP 1834	Soil lysimeters for validating models of wastewater renovation by land application [1978, 11p.] SR 78-12	Seismic velocities and subsea permafrost in the Beaufort Sea Alaska [1983, p.894-898] MP 166
Ice forces on rigid, vertical, cylindrical structures [1984, 36p.] CR 84-33	Simulation of the movement of conservative chemicals in soil solution [1978, p.371-380] MP 1156	Determining distribution patterns of ice-bonded permafrost in
Sheet ice forces on a conical structure: an experimental study [1985, p.46-54] MP 1915	Evaluation of the moving boundary theory in Darcy's flow	the U.S. Beaufort Sea from seismic data [1984, p.237- 258] MP 1839
Sheet ice forces on a conical structure: an experimental study [1985, p.643-655] MP 1906	through porous media (1978, p.142-151) MP 1147 Water movement in a land treatment system of wastewater by	Some aspects of interpreting seismic data for information or shallow subsea permafrost [1985, p.61-65] MP 195-
Characteristic frequency of force variations in continuous	overland flow (1979, p.185-206) MP 1285 Application of recent results in functional analysis to the	Nelll, C.R.
crushing of sheet ice against rigid cylindrical structures [1986, p.1-12] MP 2018	problem of water tables [1979, p.185-190] MP 1269 Traveling wave solutions of saturated-unsaturated flow	Overview of Tanana River monitoring and research studie near Fairbanks, Alaska [1984, 98p. + 5 appends.]
Impact ice force and pressure: An experimental study with urea ice [1986, p.569-576] MP 2037	through porous media (1990, p.117-122) MIP 1278	SR 84-3' Nelson, F.
Morse, J.S. USACRREL precise thermistor meter [1985, 34p.] SR 85-26	Application of recent results in functional analysis to the problem of wetting fronts [1980, p.314-318]	Observations on ice-cored mounds at Sukakpak Mountain south central Brooks Range, Alaska (1983, p.91-96)
	MP 1307 Particular solutions to the problem of horizontal flow of water	MP 165:
Mulherin, N. Communication tower icing in the New England region	and air through porous media near a wetting front [1980, p.81-85] MP 1341	Comparative near-millimeter wave propagation properties of
[1986, 7p.] MP 2109 Miller, A.	Particular solutions to the problem of vertical flow of water and air through porous media near a water table [1980,	snow or rain [1983, p.115-129] MIP 1690 Attenuation and backscatter for snow and sleet at 96, 140, and
Prazil ice formation in turbulent flow [1978, p.219-234] MP 1135	p.124-133 ₁ MP 1342	225 GHz [1984, p.41-52] MP 186- Nevel, D.E.
Measurement of the shear stress on the underside of simulated	Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media	Ice forces on vertical piles [1972, p.104-114] MP 1024
ice covers [1980, 11p.] CR 80-24 Munis, R.H.	[1981, p.57-64] MP 1419 Relationship between the ice and unfrozen water phases in	Ice forces on model structures (1975, p.400-407) MP 86:
Red and near-infrared spectral reflectance of snow (1975, p.345-360) MP 872	frozen soil as determined by pulsed nuclear magnetic reso- nance and physical desorption data [1982, 8p.]	ice forces on simulated structures [1975, p.387-396] MP 86
Detecting structural heat losses with mobile infrared thermog- raphy. Part 4: Estimating quantitative heat loss at Dart-	CR 82-15 Mobility of water in frozen soils [1982, c15p.]	Interpretation of the tensile strength of ice under triaxis
mouth College, Hanover, New Hampshire [1976, 9p.] CR 76-33	MP 2012	Interpretation of the tensile strength of ice under triaxia
Infrared thermography of buildings: Qualitative analysis of	Use of similarity solutions for the problem of a wetting front —a question of unique representation [1982, p.156-166]	stresses [1976, 9p.] CR 76-05 Creep theory for a floating ice sheet [1976, 98p.]
five buildings at Rickenbacker Air Porce Base, Columbus, Ohio [1977, 21p.] SR 77-26	MP 1640 Transport of water in frozen soil. 1. Experimental determi-	Ice forces on vertical piles [1977, 9p.] SR 76-04 CR 77-10
Infrared thermography of buildings: qualitative analysis of window infiltration loss, Federal Office Building, Burling-	nation of soil-water diffusivity under isothermal conditions [1982, p.221-226] MIP 1629	Icebreaker simulation [1977, 9p.] CR 77-16
ton, Vermont [1977, 17p.] SR 77-29 Comparative testing system of the applicability for various	Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions 1983,	Concentrated loads on a floating ice sheet [1977, p.237-245] MP 106:
thermal scanning systems for detecting heat losses in buildings [1978, p.B71-B90] MP 1212	p.15-26 ₁ MP 1661 Relationship between the ice and unfrozen water phases in	Bearing capacity of river ice for vehicles [1978, 22p.] CR 78-0:
Roof response to icing conditions [1979, 40p.]	frozen soils as determined by pulsed nuclear resonance and	Safe ice loads computed with a pocket calculator [1979,
Thermal patterns in ice under dynamic loading [1983, p.240-	Asymptotic behaviour of solutions to the problem of wetting	p.205-223 ₁ MP 1249 Review of buckling analyses of ice sheets [1980, p.131-146 ₁
243 ₁ MP 1742 Thermal (2-5.6 micron) emittance of diathermanous materials	fronts in one-dimensional, horizontal and infinite porous media (1983, p.71-78) MIP 1720	MP 132: Bending and buckling of a wedge on an elastic foundation
as a function of optical depth, critical angle and temperature [1984, p.209-220] MP 1863	Water migration due to a temperature gradient in frozen soil [1983, p.951-956] MP 1666	(1980, p.278-288 ₁ MP 130)
Time-lapse thermography: a unique electronic imaging application [1984, p.84-88] MP 2103	Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] MP 1664	Newton, J.L. International Workshop on the Sessonal Sea Ice Zone, Mon
Emittance: a little understood image deception in thermal	Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions	International Workshop on the Seasonal Sea Ice Zone, Mon terey, California, Feb. 26-Mar.1, 1979 (1980, 357p.) MP 129:
imaging applications [1985, p.72-78] MP 1962 Thermal emissivity of diathermanous materials [1985,	(1983, 8p.) CR 83-22	Ng. E. Thermal properties and regime of wet tundra soils at Barrow
p.872-878 ₁ MP 1963 Murdey, D.	Similarity solutions to the second boundary value problem of unsaturated flow through porous media [1983, p.205-213]	Alaska [1978, p.47-53] MP 1090
Field tests of the kinetic friction coefficient of sea ice [1985, 20p.] CR 85-17	MP 1721 Transport of water in frozen soil: 3. Experiments on the ef-	Niederoda, A.W. Preliminary simulation study of sea ice induced gouges in the
Laboratory and field studies of ice friction coefficient [1986,	fects of ice content (1984, p.28-34) MP 1841 Transport of water in frozen soil: 4. Analysis of experimental	sea floor [1985, p.126-135] MP 191' Numerical simulation of ice gouge formation and infilling or
p.389-400; MP 2126 Murphy, B.	results on the effects of ice content [1984, p.58-66] MP 1843	the shelf of the Beaufort Sea [1985, p.393-407] MP 190
Calibrating cylindrical hot-film anemometer sensors [1986, p.283-298] MP 1860	Role of heat and water transport in frost heaving of fine-	Ice gouge hazard analysis [1986, p.57-66] MP 210
Murphy, D.	grained porous media under negligible overburden pressure [1984, p.93-102] MP 1842	Niedringhous, E.L. Prevention of freezing and other cold weather problems a
U.S. tundra biome publication list [1983, 29p.] SR 83-29	Transport of water in frozen soil: 5, Method for measuring the vapor diffusivity when ice is absent [1984, p.172-179]	wastewater treatment facilities [1985, 49p.] SR 85-1: Niedringhene, L.
Murray, B.M. Reconnaissance observations of long-term natural vegetation	MP 1819 Similarity solutions of the Cauchy problem of horizontal flow	Maintaining frosty facilities [1985, p.9-15] MP 194
recovery in the Cape Thompson region, Alaska, and additions to the checklist of flora [1985, 75p.] CR 85-11	of water through porous media for experimental determina- tion of diffusivity [1985, p.26-31] MP 1881	Cold weather O&M (1985, p.10-15) MP 207/ Nieleen, K.G.
Murray, D.P.	Role of phase equilibrium in frost heave of fine-grained soil	Investigation of the snow adjacent to Dye-2, Greenland [1981, 23p.] SR 81-6:
Tundra disturbances and recovery following the 1949 ex- ploratory drilling, Fish Creek, Northern Alaska 1978,	under negligible overburden pressure (1985, p.30-68) MP 1896	Nixon, J.F.
81p. ₁ CE 78-28 Coastal tundra at Barrow [1980, p.1-29] MP 1356	Nakate, T. Laboratory investigation of the mechanics and hydraulics of	Design implications of subsoil thawing [1984, p.45-103] MP 170
Reconnaissance observations of long-term natural vegetation recovery in the Cape Thompson region, Alaska, and addi-	river ice jams (1976, 97p.) MP 1060 Laboratory investigation of the mechanics and hydraulics of	Nobles, L.H. Influence of irregularities of the bed of an ice sheet on deposi
tions to the shocklist of floor 1005 750 CD 98 11	diversion 1077 465	1

Notes Westerne B.C.	The same of the later of the same of the s	0.000
Notes-Hecksens, R.C. Measurement of the resistance of imperfectly elastic rock to	Effects of soluble saits on the unfrozen water contents of the Lanzhou, PRC, silt [1985, p.99-109] MP 1933	Outcalt, S.I. Computer simulation of the snowmelt and soil thermal regime
the propagation of tensile cracks (1985, p.7827-7836) MP 2052	Toxic organics removal kinetics in overland flow land treat- ment [1985, p.707-718; MP 2111	at Barrow, Alaska [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and
Novick, M.A.	Soil-water potential and unfrozen water content and tempera-	subarctic [1977, p.24-32] MIP 971
Losses from the Fort Wainwright heat distribution system [1981, 29p.] SR 81-14	ture [1985, p.1-14] MP 1932 Experimental study on factors affecting water migration in	Thermal properties and regime of wet tundra soils at Barrow, Alaska (1978, p.47-53) MP 1096
Nyland, J.R. Engineering aspects of an experimental system for land reno-	frozen morin clay (1985, p.123-128) MP 1897 Prediction of unfrozen water contents in frozen soils by a two-	Observations on ice-cored mounds at Sukakpak Mountain, south central Brooks Range, Alaska (1983, p.91-96)
vation of secondary effluent [1978, 26p.] SR 78-23	point or one-point method [1985, p.83-87] MIP 1929	MP 1653
O'Brien, H. Atmospheric conditions and concurrent snow crystal obser-	Model for dielectric constants of frozen soils [1985, p.46-57] MP 1926	Relationships between estimated mean annual air and perma- frost temperatures in North-Central Alaska (1983, p.462-
vations during SNOW-ONE-A [1983, p.3-18] MP 1754	Olsen, R.O.	467 ₁ MP 1658 Potential responses of permafrost to climatic warming [1984,
Snow-cover characterization: SADARM support [1984,	Comparative near-millimeter wave propagation properties of snow or rain [1983, p.115-129] MIP 1690	p.92-105j NLP 1710
p.409-411 ₁ MP 2095 O'Brien, H.W.	O'Neill, K.	Overgaard, S. Ice properties in the Greenland and Barents Seas during sum-
Red and near-infrared spectral reflectance of snow 1975,	Analysis of coupled heat and moisture flow in an unasturated soil [1979, p.304-309] MP 1259	mer [1983, p.142-164] MP 2062
Observations of the ultraviolet spectral reflectance of snow	Numerical solutions for rigid-ice model of secondary frost heave [1980, p.656-669] MP 1454	Oxton, A. Reliable, inexpensive radio telemetry system for the transfer
[1977, 19p.] CR 77-27 Near-infrared reflectance of snow-covered substrates [1981,	Continuously deforming finite elements for the solution of	of meteorological and atmospheric data from mountain-top sites [1986, 6p.] MP 2107
17p.; CE 81-21	parabolic problems, with and without phase change [1981, p.81-96] MP 1493	Page, F.W.
Snow crystal habit [1982, p.181-216] MP 1561 Snow cover characterization [1982, p.559-577]	Bottom heat transfer to water bodies in winter [1981, \$p.] SR 81-18	Geochemistry of subses permafrost at Prudhoe Bay, Alaska [1978, 70p.] SR 78-14
MP 1564 Problems in anow cover characterization (1982, p.139-147)	Highly efficient, oscillation free solution of the transport	Palazzo, A.J. Effects of wastewater application on the growth and chemical
MP 1987	equation over long times and large spaces (1981, p.1665- 1675 ₁ MIP 1497	composition of forages [1976, 8p.] CR 76-39
Catalog of smoke/obscurant characterization instruments [1984, p.77-82] MP 1865	One-dimensional transport from a highly concentrated, trans- fer type source (1982, p.27-36) MP 1489	Reclamation of acidic dredge soils with sewage sludge and lime at the Chesapeake and Delaware Canal [1977, 24p.]
Overview of meteorological and snow cover characterization at SNOW-TWO [1984, p.171-191] MP 1868	Numerical solutions for a rigid-ice model of secondary frost	SR 77-19
Odar, F.	heave [1982, 11p.] CR 82-13 Mobility of water in frozen soils [1982, c15p.]	Land application of wastewater: forage growth and utilization of applied nitrogen, phosphorus and potassium (1977,
IMPACT OF SPHERES ON ICE. CLOSURE (1972, p.473) MIP 988	MP 3012	p.171-180 ₁ MP 975 Utilization of sewage sludge for terrain stabilization in cold
Ocechger, H.	Simple fixed mesh finite element solution of two-dimensional phase change problems [1983, p.653-658] MP 1584	regions (1977, 45p.) SR 77-37
C-14 and other isotope studies on natural ice [1972, p.D70- D92] MP 1052	Physics of mathematical frost heave models: a review 1983, p.275-291; MP 1568	Uptake of nutrients by plants irrigated with municipal was- tewater effluent (1978, p.395-404) MP 1151
Obstrom, E.G.	2-d transient freezing in a pipe with turbulent flow, using a	Growth and nutrient uptake of forage grasses when receiving various application rates of wastewater [1978, p.157-163]
Cantilever beam tests on reinforced ice (1976, 12p.) CR 76-07	continually deforming mesh with finite elements [1983, p.102-112] MP 1893	MP 1153
O'Keefe, J. Laboratory experiments on icing of rotating blades (1979,	Boundary integral equation solution of moving boundary	Effects of wastewater and sewage sludge on the growth and chemical composition of turfgrass [1978, 11p.]
p.85-92 ₃ MP 1236	phase change problems [1983, p.1825-1850] MP 2093	SR 78-20 Five-year performance of CRREL land treatment test cells;
Studies of high-speed rotor icing under natural conditions (1983, p.117-123) MP 1635	Solution of 2-d axisymmetric phase change problems on a fixed mesh, with zero width phase change zone (1983,	water quality plant yields and nutrient uptake [1978,
Oleekiw, M.M. Computer modeling of time-dependent rime icing in the st-	p.134-146 ₁ MP 1894	24p. ₁ SR 78-26 Land treatment systems and the environment [1979, p.201-
mosphere (1983, 74p.) CR 83-02	Fixed mesh finite element solution for cartesian two-dimensional phase change [1983, p.436-441] MCP 1702	225 ₁ MP 1414 International and national developments in land treatment of
Oliphant, J.L. Relationship between the ice and unfrozen water phases in	Computation of porous media natural convection flow and phase change [1984, p.213-229] MIP 1895	wastewater [1979, 28p.] MP 1420
frozen soil as determined by pulsed nuclear magnetic reso- nance and physical desorption data [1982, 8p.]	Exploration of a rigid ice model of frost heave (1985, p.281-	Utilization of sewage sludge for terrain stabilization in cold regions, Part 2 [1979, 36p.] SR 79-28
CR 82-15	296 ₁ MP 1880 Thermal convection in snow (1985, 61p., CR 85-69	Land application of wastewater: effect on soil and plant potas- sium [1979, p.309-312] MP 1228
Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994	Finite element simulation of ice crystal growth in subcooled	Utilization of sewage sludge for terrain stabilization in cold
Mobility of water in frozen soils [1982, c15p.] MP 2012	sodium-chloride solutions [1985, p.527-532] MP 2100	regions. Pt. 3 [1979, 33p.] SR 79-34 Revegetation at two construction sites in New Hampshire and
Method for measuring enriched levels of deuterium in soil	Experiments on thermal convection in snow [1985, p.43-47] MP 2006	Alaska [1980, 21p.] CR 80-03 Wastewater treatment in cold regions by overland flow
water [1982, 12p.] SR 82-25 Transport of water in frozen soil. 1. Experimental determi-	Theory of natural convection in snow [1985, p.10,641-10,-	[1980, 14p.] CR 80-07
nation of soil-water diffusivity under isothermal conditions (1982, p.221-226) MP 1629	649 ₁ MP 1957 Onstott, R.G.	Forage grass growth on overland flow systems (1980, p.347-354) MP 1402
Assessment of the treatability of toxic organics by overland	Surface-based scatterometer results of Arctic sea ice [1979,	Plant growth on a gravel soil: greenhouse studies [1981, 8p.] SR 81-04
Relationship between the ice and unfrozen water phases in	p.78-85 ₁ MP 1266 100 MHz dielectric constant measurements of snow cover.	Seasonal growth and accumulation of nitrogen, phosphorus,
frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632	dependence on environmental and snow pack parameters [1985, p.829-834] MP 1913	and potassium by orchardgrass irrigated with municipal waste water [1981, p.64-68] MP 1425
Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions (1983,	Ormsby, J.P.	Sessonal growth and uptake of nutrients by orchardgrass irri-
p.15-26 ₁ MP 1601	Landsat digital analysis of the initial recovery of the Kokolik River tundra fire area, Alaska [1979, 15p.] MP 1638	gated with wastewater [1981, 19p.] CR 81-08 Seven-year performance of CRREL slow-rate land treatment
Effect of unconfined loading on the unfrozen water content of Manchester silt [1983, 17p.] SR 83-18	LANDSAT digital analysis of the initial recovery of burned tundra at Kokolik River, Alaska [1980, p.263-272]	prototypes (1981, 25p.) SR 81-12 Wastewater treatment by a prototype slow rate land treatment
Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] MP 1664	MP 1391	system (1981, 44p.) CR 81-14
Water migration due to a temperature gradient in frozen soil	O'Rourks, M. Analysis of roof snow load case studies; uniform loads [1983,	Vegetation selection and management for overland flow sys- tems [1982, p.135-154] MP 1511
(1983, p.951-956) MP 1666 Transport of water in frozen soil. 1. Experimental determi-	29p. ₁ CE 83-01	Preliminary assessment of the nutrient film technique for was- tewater treatment {1982, 15p.] SR 82-04
nation of soil-water diffusivity under isothermal conditions [1983, 8p.] CR 83-22	O'Rourke, M.J. Snow loads on structures [1978, p.418-428] MP 1881	Plant growth and management for wastewater treatment in
Isothermal compressibility of water mixed with Na-saturated	Uniform snow loads on structures [1982, p.2781-2798] MP 1574	overland flow systems [1982, 21p.] SR 82-05 Sewage studge aids revegetation [1982, p.198-301]
Transport of water in frozen soil: 3. Experiments on the ef-	Oegoed, S.	MP 1735
fects of ice content (1984, p.28-34) MP 1841 Effects of low temperatures on the growth and unfrozen water	Lessons learned from examination of membrane roofs in Alas- ks [1986, p.277-290] MP 2003	Long-term plant persistence and restoration of acidic dredge soils with sewage aludge and lime [1983, 11p.]
content of an aquatic plant [1984, 8p.] CR 84-14 Transport of water in frozen soil: 4. Analysis of experimental	O'Steen, D.A.	CR 83-28 Effects of low temperatures on the growth and unfrozen water
results on the effects of ice content [1984, p.58-66]	Ice engineering (1980, p.41-47) MP 1602 Osterkamp, T.E.	content of an aquatic plant (1984, 8p.) CR 84-14 Effect and disposition of TNT in a terrestrial plant (1986,
MP 1843 Effects of soluble salts on the unfrozen water contents of the	Yukon River breakup 1976 [1977, p.592-596] MP 960	p.49-52 ₁ MP 2098
Lanzhou, P.R.C., silt [1984, 18p.] CR 84-16 Effects of magnetic particles on the unfrozen water content of	Chemistry of interstitial water from subsea permafrost, Prudhoe Bay, Alaska [1978, p.92-98] MP 1385	Palmer, R.A. Clear improvement in obscuration [1985, p.476-477]
frozen soils determined by nuclear magnetic resonance	Break-up dates for the Yukon River; Pt.1. Rampart to White- horse, 1896-1978 [1979, c50 leaves] MP 1317	MP 2067
[1984, p.63-73] MP 1790 Deuterium diffusion in a soil-water-ice mixture [1984, 11p.]	Break-up dates for the Yukon River; Pt.2. Alakanuk to Tana-	Panghura, T. Use of Landsat data for predicting snowmelt runoff in the
SR \$4-27 Experimental measurement of channeling of flow in porous	na, 1883-1978 [1979, c50 leaves] MP 1318 Break-up of the Yukon River at the Haul Road Bridge: 1979	upper Saint John River basin (1983, p.519-533) MP 1694
media [1985, p.394-399] MP 1967 Water migration in unsaturated frozen morin clay under lin-	[1979, 22p. + Figs.] MP 1315 Ott, R.	Use of radio frequency sensor for snow/soil moisture water content measurement [1983, p.33-42] MP 1689
ear temperature gradients (1985, p.111-122)	Prevention of freezing and other cold weather problems at	Hydrologic forecasting using Landsat data [1983, p.159-
MP 1934	wastewater treatment facilities [1985, 49p.] SR 85-11	168 ₁ MP 1691

Penghura, T. (cost.)	Harnessing frazil ice (1981, p.227-237) MP 1396	Prowse, T.D.
USACRREL's snow, ice, and frozen ground research at the	loe control arrangement for winter navigation [1981, p.1096-	Techniques for measurement of snow and ice on freshwater
Sleepers River Research Watershed [1984, p.229-240] MP 2071	1103 ₂ MP 1449 Tests of frazil collector lines to assist ice cover formation	(1986, p.174-222) MP 2000 Quant, A.
Paquette, R.G.	[1981, p.442-448] MP 1488	Hydraulic transients: a seismic source in volcanoes and gla-
"Pack ice and icebergs"—report to POAC 79 on problems of the seasonal sea ice zone: an overview (1979, p.320-337)	Ice sheet retention structures [1983, 33p.] CR 83-30 Effectiveness and influences of the navigation ice booms on	ciers (1979, p.654-656) MP 1181 Comparison of thermal observations of Mount St. Helens
MP 1520 Perker, B.C.		before and during the first week of the initial 1980 eruption
Ross Ice Shelf Project environmental impact statement July,	the St. Mary's [1984, 12p.] Observations during BRIMFROST '83 [1984, 36p.] SR 84-10	[1980, p.1526-1527] MP 1482 Phild dynamic analysis of volcanic tremor [1982, 12p.]
1974 (1978, p.7-36) MP 1075 Planetary and extraplanetary event records in polar ice caps	Ice sheet retention structures [1984, p.339-348] MP 1832	CR 82-32 Source mechanism of volcanic tremor [1982, p.8675-8683]
[1980, p.18-27] MP 1461	Preliminary study of a structure to form an ice cover on river	MP 1576
Nitrogenous chemical composition of antarctic ice and snow [1981, p.79-81] MIP 1541	rapids during winter [1986, p.439-450] MP 2128 Porman, C.D.	Qin, G. Ion and moisture migration and frost heave in freezing Morin
Nitrate fluctuations in antarctic snow and firm: potential sources and mechanisms of formation [1982, p.243-248]	Wastewater stabilization pond linings [1978, 116p.]	clay (1986, p.1014) MP 1976
MP 1551	SR 78-28 Perren, N.	Quarry, S.T. Methodology for nitrogen isotope analysis at CRREL [1978,
Parker, L.V. Disinfection of wastewater by microwaves [1980, 15p.]	Mechanical properties of multi-year sea ice. Phase 2: Test	57p. ₁ SR 78-00
STR 90-01	results [1985, 81p.] CR 85-16 Peters, R.E.	Distribution and properties of road dust and its potential im- pact on tundra along the northern portion of the Yukon
Dynamics of NH4 and NO3 in cropped soils irrigated with wastewater [1980, 20p.] SR 80-27	Rational design of overland flow systems [1980, p.114-121] MP 1400	River-Prudhoe Bay Haul Road. Chemical composition of dust and vegetation [1978, p.110-111] MP 1116
Effect of soil temperature and pH on nitrification kinetics in	Toxic volatile organics removal by overland flow land treat-	Five-year performance of CRREL land treatment test cells;
soils receiving a low level of ammonium enrichment [1981, 27p.] SR 81-33	ment (1981, 14p.) MP 1421 Petrov, LG.	water quality plant yields and nutrient uptake 1978, 24p. SR 78-26
Baseline water quality measurements at six Corps of Engineers reservoirs, Summer 1981 [1982, 55p.] SR 82-30	Standardized testing methods for measuring mechanical prop-	Blank corrections for ultratrace atomic absorption analysis
Assessment of the treatability of toxic organics by overland	erties of ice (1981, p.245-254) MIP 1556 4th report of working group on testing methods in ice (1984,	[1979, 5p.] CR 79-63 Documentation of soil characteristics and climatology during
flow [1983, 47p.] CR 83-03 Corps of Engineers land treatment of wastewater research	p.1-41 ₁ MP 1886	five years of wastewater application to CRREL test cells [1979, 82p.] SR 79-23
program: an annotated bibliography [1983, 82p.]	Ptwt, T.L. ORIGIN AND PALEOCLIMATIC SIGNIFICANCE OF	Use of 15N to study nitrogen transformations in land treat-
SR 83-09 Impact of dredging on water quality at Kewsunee Harbor,	LARGE-SCALE PATTERNED GROUND IN THE DONNELLY DOME AREA, ALASKA (1969, 87p.)	ment (1979, 32p.) SR 79-31 Quina, W.F.
Wisconsin [1984, 16p.] CR 84-21	MP 1180	Revegetation and erosion control observations along the
Impact of slow-rate land treatment on groundwater quality: toxic organics [1984, 36p.] CR 84-30	Photospiace, G. Long distance heat transmission with steam and hot water	Trans-Alaska Pipeline—1975 summer construction season [1977, 36p.] SR 77-68
Toxic organics removal kinetics in overland flow land treat- ment [1985, p.707-718] MP 2111	(1976, 39p.) MIP 938	Use of a light-colored surface to reduce sessonal thaw pene-
Suitability of polyvinyl chloride pipe for monitoring TNT,	Heat transmission with steam and hot water [1978, p.17-23] MP 1956	tration beneath embankments on permafrost (1977, p.86- 99 ₁ MIP 954
RDX, HMX and DNT in groundwater [1985, 27p.] SR 85-12	Waste heat recovery for heating purposes [1978, p.30-33]	Experimental scaling study of an annular flow ice-water heat
Purrish, S.	MP 1256 Losses from the Fort Wainwright heat distribution system	sink (1977, 54p.) CR 77-15 Design procedures for underground heat sink systems (1979,
Selected climatic and soil thermal characteristics of the Prudhoe Bay region [1975, p.3-12] MP 1054	(1981, 29p.) SR 81-14	186p. in var. pagns.; SE 79-66
Parrott, W.H.	Effects of ice on coal movement via the inland waterways [1981, 72p.] SR 81-13	Racicet, L. Forces on an ice boom in the Beauharnois Canal (1975).
Some effects of air cushion vehicle operations on deep snow [1972, p.214-241] MIP 887	Transient analysis of heat transmission systems [1981, 53p.] CR 81-24	p.397-407 ₁ NiP 858
Portable instrument for determining snow characteristics	Snow in the construction of ice bridges (1985, 12p.)	Racine, C. Effects of a tundra fire on soils and plant communities along
related to trafficability [1972, p.193-204] MP 886	SIR 85-18	
Parasinon, N.	Thermal analysis of a shallow utilides 1986 10n.	a hillslope in the Seward Peninsula, Alaska [1980, 21p.)
Regulation and the deformation of wet snow [1978, p.639-	Thermal analysis of a shallow utilidor [1986, 10p.] MP 2021	Ratkovskii, IU.V.
	Phetteplace, G.E.	Ratkovskii, IU.V. Core drilling through Ross Ice Shelf (1979, p.63-64)
Regelation and the deformation of wet snow [1978, p.639-650; MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by	Phottsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions 1982,	Ratkovskii, IU.V. Core drilling through Ross Ice Shelf (1979, p.63-64)
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow [1979, p.185-206] MP 1285 Nitrogen transformations in a simulated overland flow was-	Phetteplace, G.E. Evaluating the heat pump alternative for heating enclosed	Rathovskii, IU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-65) MP 1336
Regulation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16	MP 2021 Phottuplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1982, 23p.] Analysis of heat losses from the central heat distribution system at Port Wainwright [1982, 20p.] MP 1980	Ratkevskit, IU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206; MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.; SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in	Photteplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) MP 1883
Regelation and the deformation of wet snow [1978, p.639-650; MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206; MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.; SR 80-16 Patterson, W.A., III	MP 2021 Phottsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1982, 23p.] Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat con-	Ratkevskit, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] MP 1832
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206; MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.; SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Paulses, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91]	MP 2021 Photteplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] Analysis of heat losses from the central heat distribution system at Fort Wainwright [1932, 20p.] MP 1950 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] Computer models for two-dimensional steady-state heat conduction [1983, 90p.] Comparative field testing of buried utility locators [1984,	Ratkovskit, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramssler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] MP 1832 Ice dynamics in the Canadian Archipelago and adjacent Archipelago and Ar
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285. Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1804 Paulson, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340	MP 2021 Phottsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1982, 23p.] Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] Computer models for two-dimensional steady-state heat conduction [1983, 90p.] Comparative field testing of buried utility locators [1984, 25p.] MP 1977	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] MP 1832 Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations [1975, p.853-877] MP 1843
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Paulsen, C.A. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer (1981, p.437-460) MP 1479	MP 2021 Phottsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] Analysis of heat losses from the central heat distribution system at Fort Wainwright [1932, 20p.] MP 1998 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] Computer models for two-dimensional steady-state heat conduction [1983, 90p.] Comparative field testing of buried utility locators [1984, 25p.] Simple design procedure for heat transmission system piping [1985, p.1748-1752] MP 1942	Ratkovskii, IU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] MP 1832 Ice dynamics in the Candian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations [1975,
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pasteon, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1932, 20p.] MP 1988 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction (1983, 90p.) CR 83-10 Comparative field testing of buried utility locators (1984, 25p.) Simple design procedure for heat transmission system piping	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1832 Ice dynamics in the Canadian Archipelage and adjacent Archice basin as determined by ERTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Paulses, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460] MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas [1983, p.27-39] MP 1492	MP 2021 Phottsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] Analysis of heat losses from the central heat distribution system at Fort Wainwright [1932, 20p.] MP 1990 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] Computer models for two-dimensional steady-state heat conduction [1983, 90p.] Comparative field testing of buried utility locators [1984, 25p.] Simple design procedure for heat transmission system piping [1985, p.1748-1752] MP 1972 Simplified design procedures for heat transmission system piping [1985, p.451-456] MP 1979 Heat recovery from primary effluent using heat pumps	Ratkovskii, IU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) MP 1863 Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1832 Ice dynamics in the Canadian Archipelage and adjacent Archic beain as determined by ERTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) MP 1969
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Paulson, C.A. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer (1981, p.437-460) MP 1479 Payse, J.O., Jr. Pull-depth and granular base course design for frost areas (1983, p.27-39) MP 1492 Passiat, D.A. Insulating and load-supporting properties of sulfur foam for	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1933, 90p.] CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] Simple design procedure for heat transmission system piping [1985, p.1748-1752] MP 1979 Heat recovery from primary effluent using heat pumps [1985, p.199-203] Pitelka, P.A.	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by ERTS-1 observations [1975, p.853-877] Integrated approach to the remote sensing of floating ice [1977, p.445-487] Visual observations of floating ice from Skylab [1977, p.353-379] Ramcourt, E.L. Reliable, inexpensive radio telemetry system for the transfer
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285. Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1804 Paulson, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a bot-film anemometer [1981, p.437-460] MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passint, D.A.	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1933, 90p.] CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] Simplified design procedures for heat transmission system piping [1985, p.451-456] MP 1979 Heat recovery from primary effluent using heat pumps [1985, p.193-203] MP 1978	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Remseler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Soa Experiment [1974, 197p.] MP 1863 Ice dynamics in the Canadian Archipelago and adjacent Archice to beain as determined by ERTS-1 observations [1975, p.853-877] MP 1863 Integrated approach to the remote sensing of floating ice [1977, p.445-487] Visual observations of floating ice from Skylab [1977, p.353-379] Remosert, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites [1986, 6p.] NP 2167
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pasteso, C.A. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas (1983, p.27-39) MP 1492 Passent, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions (1979, 21p.) CR 79-18	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1933, 90p.] CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] Simple design procedure for heat transmission system piping [1985, p.1748-1752] MP 1979 Heat recovery from primary effluent using heat pumps [1985, p.199-203] MP 1978 Pitelka, P.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pettie, D.S.	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by ERTS-1 observations [1975, p.853-877] Integrated approach to the remote sensing of floating ice [1977, p.445-487] Visual observations of floating ice from Skylab [1977, p.353-379] Ramcourt, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites [1986, 6p.] Ramd, J.E.
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Passless, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460] MP 1479 Payne, J.O., Jr. Pull-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passlat, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.]	Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1982, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1950 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1983, 90p.] Comparative field testing of buried utility locators [1984, 25p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] Simplified design procedures for heat transmission system piping (1985, p.451-456) MF 1979 Heat recovery from primary effluent using heat pumps (1985, p.199-203) MF 1978 Pitelka, P.A. Word model of the Barrow ecosystem [1970, p.41-43] Pettle, D.S. Prevention of freezing and other cold weather problems at	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Remassler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Soa Experiment [1974, 197p.] MP 1832 Ice dynamics in the Canadian Archipelago and adjacent Archice basin as determined by ERTS-1 observations [1975, p.853-877] MP 1832 Integrated approach to the remote sensing of floating ice [1977, p.445-487] Visual observations of floating ice from Skylab [1977, p.353-379] Visual observations of floating ice from Skylab [1977, p.353-379] Remosurt, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites [1986, 6p.] Rend, J.H. USA CRREL shallow drill [1976, p.133-137] MP 873 Ross Ice Shelf Project drilling, October-December 1976
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pastees, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460] MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passent, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] CR 79-18 Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] Messurement of the resistance of imperfectly elastic rock to	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1933, 90p.] CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] Simple design procedure for heat transmission system piping [1985, p.1748-1752] MP 1977 Simple design procedures for heat transmission system piping [1985, p.451-456] MP 1979 Heat recovery from primary effluent using heat pumps [1985, p.199-203] MP 1978 Pitelka, P.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pottle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramceurt, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Ramd, J.H. USA CRREL shallow drill (1976, p.133-137) Ross Ice Shelf Project drilling, October-December 1976 (1977, p.150-152) NP 1961
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Passison, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payse, J.O., Jr. Full-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passist, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] CR 79-18 Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] CR 85-10	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1933, 90p.] CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] Simplified design procedures for heat transmission system piping [1985, p.194-203] Heat recovery from primary effluent using heat pumps [1985, p.194-203] Pitalka, F.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pottle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.) MP 1893 Ice dynamics in the Canadian Archipelage and adjacent Archice basin as determined by ERTS-1 observations [1975, p.853-877] Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab [1977, p.353-379] Ramosurt, R.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Ramol, J.H. USA CRREL shallow drill [1976, p.133-137] Ross Ice Shelf Project drilling. October-December 1976 (1977, p.150-152) Danish deep drill; progress report: Pebruary-March 1979 (1980, 37p.)
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Passleen, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460] MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passlet, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] CR 79-18 Peck, L. Review of methods for generating synthetic seismograms (1985, 3pp.) Messurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1933, 90p.] CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] MF 1972 Heat recovery from primary effluent using heat pumps [1985, p.199-203] MF 1978 Pitelka, F.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pettie, D.S. Prevention of freezing and other cold weather problems at twastewater treatment facilities [1985, 49p.] SR 85-11 Pomsé, C.E. Land treatment: present status, future prospects [1978, p.98-102] Power, J.M.	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-65) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by BRTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramcourt, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Rand, J.H. USA CRREL shallow drill (1976, p.133-137) Ress Ice Shelf Project drilling. October-December 1976 (1977, p.150-152) Danish deep drill; progress report: Pebruary-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase I: casting opera-
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Pattersoa, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Passea, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passist, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] CR 85-10 Measurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052 Pairsat, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1932, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] CR 83-10 Computer models for two-dimensional steady-state heat conduction (1983, 90p.) CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] Simplified design procedure for heat transmission system piping (1985, p.1748-1752) Simplified design procedures for heat transmission system piping (1985, p.159-203) Heat recovery from primary effluent using heat pumps (1985, p.199-203) Pitalka, P.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pottle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] Pound, C.E. Land treatment: present status, future prospects [1978, p.98-102] Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-198)	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Soa Experiment [1974, 197p.] MP 1832 Ice dynamics in the Canadian Archipelage and adjacent Archice basin as determined by ERTS-1 observations [1975, p.853-877] Integrated approach to the remote sensing of floating ice [1977, p.445-487] Visual observations of floating ice from Skylab [1977, p.353-379] Ramsest, K.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites [1986, 6p.] Rams, J.H. USA CRREL shallow drill [1976, p.133-137] Ross Ice Shelf Project drilling. October-December 1976 [1977, p.150-152] Danish deep drill; progress report: February-March 1979 [1980, 37p.] 1979 Greenland Ice Sheet Program. Phase I: casing operation [1980, 18p.] New 2 and 3 inch diameter CRREL snow samplers 1980,
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Pattersoa, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Passea, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passist, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] CR 85-10 Measurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052 Pairsat, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1982, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1983, 90p.] MP 1977 Comparative field testing of buried utility locators [1984, 25p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] Simplified design procedures for heat transmission system piping [1985, p.451-456] MF 1979 Heat recovery from primary effluent using heat pumps (1985, p.199-203) MF 1978 Pitelka, P.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pettle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Pound, C.E. Land treatment: present status, future prospects [1978, p.98-102,] Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-199] MP 1510	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-65) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1833 Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by BRTS-1 observations (1975, p.853-877) MP 1985 Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Kancourt, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top intee (1986, 6p.) MP 2167 Rand, J.H. USA CRREL shallow drill (1976, p.133-137) Ress Ice Shelf Project drilling, October-December 1976 (1977, p.150-152) Danish deep drill; progress report: Pebruary-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase I: casing operation (1980, 18p.) New 2 and 3 inch diameter CRREL anow samplers -1980, p.199-200, MP 1438
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pasteso, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payse, J.O., Jr. Pull-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passiat, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] Messurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052 Pelreat, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peaner, E. Designing for frost heave conditions [1984, p.22-44] MP 1705	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1932, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] CR 83-10 Computer models for two-dimensional steady-state heat conduction (1933, 90p.) CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] Simplified design procedure for heat transmission system piping (1985, p.1748-1752) Simplified design procedures for heat transmission system piping (1985, p.451-456) MP 1979 Heat recovery from primary effluent using heat pumps (1985, p.199-203) Pitalka, F.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pettle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peusd, C.E. Land treatment: present status, future prospects [1978, p.98-102] Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-198] MP 1510 Snowpack estimation in the St. John River basin [1980, p.467-486) MP 1779	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Soa Experiment [1974, 197p.] MP 1832 Ice dynamics in the Canadian Archipelage and adjacent Archice basin as determined by ERTS-1 observations [1975, p.853-877] Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab [1977, p.353-379] Ranceurt, K.L. Ranceurt, E.L. Ranceurt, E.L. Ranceurt, E.L. USA CRREL shallow drill [1976, p.133-137] MP 2167 Rand, J.H. USA CRREL shallow drill [1976, p.133-137] MP 873 Ross Ice Shelf Project drilling. October-December 1976 (1977, p.150-152) Danish deep drill; progress report: February-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase 1: casing operation [1980, 18p.] New 2 and 3 inch diameter CRREL snow samplers: 1980, p.199-200, CRREL 2-inch fraxil ice sampler [1982, 8p.] Developing a water well for the ice beachfilling of DYE-2
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1285 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pasleon, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460] MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passist, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] CR 79-18 Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] Mesurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052 Peirent, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Penner, E. Designing for frost heave conditions [1984, p.22-44] MP 1765 Perham, R.E.	Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1982, 20p.) MP 1950 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1983, 90p.] Computer models for two-dimensional steady-state heat conduction [1983, 90p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] MP 1977 Simplified design procedures for heat transmission system piping [1985, p.451-456] MP 1979 Heat recovery from primary effluent using heat pumps [1985, p.199-203] MP 1979 Pitelka, R.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pottle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peand, C.E. Land treatment: present status, future prospects [1978, p.98-102] Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-199] Snowpack estimation in the St. John River basin [1980, p.467-486) MP 1779 Powers, D.	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramocart, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Rmad, J.H. USA CRREL shallow drill (1976, p.133-137) RP 273 Ross Ice Shelf Project drilling, October-December 1976 (1977, p.150-152) Danish deep drill; progress report: February-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase I: casing operation (1980, 18p.) Nev 2 and 3 inch diameter CRREL snow samplers : 1980, p.199-200, MP 1430 CRREL 2-inch frazil ice sampler (1982, 8p.) Developing a water well for the loc backfilling of DYE-2 1982, 19p.) SR 22-32
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pasteos, C.A. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer (1981, p.437-460) MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas (1983, p.27-39) MP 1492 Passalet, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions (1979, 21p.) CR 79-18 Peck, L. Review of methods for generating synthetic seismograms (1985, 39p.) CR 85-10 Measurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks (1985, p.7827-7836) MP 2052 Peirsent, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.) SR 85-11 Penner, E. Designing for frost heave conditions (1984, p.22-44) MP 1705 Perhess, R.E. Ice forces on an ice boom in the Beauharnois Canal [1975,	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1922, 23p.] Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1976 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] Computer models for two-dimensional steady-state heat conduction [1983, 90p.] Comparative field testing of buried utility locators [1984, 25p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] Simplified design procedures for heat transmission system piping [1985, p.451-456] Heat recovery from primary effluent using heat pumps (1985, p.199-203) Pitulka, P.A. Word model of the Barrow ecosystem [1970, p.41-43] Pottle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] Found, C.E. Land treatment: present status, future prospects [1978, p.98-102) Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-198] MP 1510 Snowpack estimation in the St. John River basin [1980, p.467-486] Powers, D. Baperiments on thermal convection in snow [1985, p.43-47] MP 2006	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1833 Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.83-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramseart, K.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Ramd, J.H. USA CRREL shallow drill (1976, p.133-137) Ross Ice Shelf Project drilling. October-December 1976 (1977, p.150-152) Danish deep drill; progress report: February-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase 1: casing operation (1980, 18p.) New 2 and 3 inch diameter CRREL snow samplers: 1980, 2199-200, 21
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Passock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Passock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Possock, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payna, J.O., Jr. Full-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passint, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] CR 79-18 Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] CR 85-10 Messurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052 Poircast, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peaner, E. Designing for frost heave conditions [1984, p.22-44] MP 1705 Perham, R.E. Ice forces on vertical piles [1972, p.104-114] MP 1024	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] CR 83-10 Computer models for two-dimensional steady-state heat conduction (1983, 90p.) CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] MP 1977 Simple design procedure for heat transmission system piping (1985, p.148-1752) Simplified design procedures for heat transmission system piping (1985, p.451-456) MP 1979 Heat recovery from primary effluent using heat pumps (1985, p.199-203) MP 1978 Pitelka, F.A. Word model of the Barrow ecosystem (1970, p.41-43) MP 1943 Pottle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Pound, C.E. Land treatment: present status, future prospects (1978, p.98-102) MP 1417 Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques (1979, p.197-198) MP 1510 Snowpack estimation in the St. John River basin (1980, p.467-486) MP 1799 Powers, D. Experiments on thermal convection in snow (1985, p.40, 641-10, 649) MP 1957	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf [1979, p.63-64] MP 1337 Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] Remseler, R.O. Growth and mechanical properties of river and lake ice [1972, 243p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] Results of the US contribution to the Joint US/USSR Bering Sea Experiment [1974, 197p.] Results of determined by ERTS-1 observations [1975, p.853-877] MP 1883 Integrated approach to the remote sensing of floating ice [1977, p.445-487] Visual observations of floating ice from Skylab [1977, p.353-379] Visual observations of floating ice from Skylab [1977, p.353-379] Visual observations of floating ice from Skylab [1977, p.353-379] Remosurt, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites [1986, 6p.] NP 2107 Read, J.H. USA CRREL shallow drill [1976, p.133-137] MP 873 Ross Ice Shelf Project drilling, October-December 1976 [1977, p.150-152] Danish deep drill; progress report: February-March 1979 [1980, 37p.] SR 98-43 1979 Greenland Ice Sheet Program. Phase I: casing operation [1980, 18p.] SR 80-43 New 2 and 3 inch diameter CRREL snow samplers : 1980, p.199-200, CRREL 2-inch frazil ice sampler (1982, 8p.) CRREL 2-inch frazil ice sampler (1982, 8p.) SR 82-33 Simple boom assembly for the shipboard deployment of sir-
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pasterson, C.A. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer (1981, p.437-460) MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas (1983, p.27-39) MP 1492 Passalat, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions (1979, 21p.) CR 79-18 Peck, L. Review of methods for generating synthetic seismograms (1985, 39p.) CR 85-10 Messurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks (1985, p.7827-7836) MP 2052 Peirsent, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities (1985, 49p.) SR 85-11 Penner, E. Designing for frost heave conditions (1984, p.22-44) MP 1705 Perhem, R.E. Ice forces on an ice boom in the Beauharnois Canal (1975, p.397-407) MP 858 St. Marys River ice booms. Design force estimate and felse measurements (1977, 26p.) CR 77-04	Pasturplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1950 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1983, 90p.] MP 1977 Comparative field testing of buried utility locators [1984, 25p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] MP 1977 Simple design procedures for heat transmission system piping [1985, p.451-456] MP 1979 Heat recovery from primary effluent using heat pumps [1985, p.199-203] MP 1979 Pitelka, R.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pottle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peemd, C.E. Land treatment: present status, future prospects [1978, p.98-102, MF 1417 Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-199] Power, D. Raperiments on thermal convection in snow [1985, p.43-47] Theory of natural convection in snow [1985, p.10,641-10,-649] Powers, D.J.	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1932 Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramseart, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Ramd, J.H. USA CRREL shallow drill (1976, p.133-137) Ross Ice Shelf Project drilling. October-December 1976 (1977, p.150-152) Danish deep drill; progress report: February-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase 1: casing operation (1980, 18p.) New 2 and 3 inch diameter CRREL snow samplers 1980, p.199-200; CREBL 2-inch frazil ice sampler (1982, 8p.) Developing a water well for the shipboard deployment of six-sea interaction instruments (1983, 14p.) SR 82-32 Simple boom assembly for the shipboard deployment of six-sea interaction instruments (1983, 14p.) SR 83-32 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway (1984, 28p.) SR 83-38 Method of detecting voids in rubbled ice (1984, p.183-188)
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Pattersoa, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Passea, C.A. Turbulent heat flux from Arctic leads [1979, p.57-9]; MP 1340 Observations of condensate profiles over Arctic leads with a bot-film anemometer [1981, p.437-460) MP 1479 Payse, J.O., Jr. Pull-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passist, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] CR 85-10 Messurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052 Paireat, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peaner, E. Designing for frost heave conditions [1984, p.22-44] MP 1705 Perham, R.E. Ice forces on vertical piles [1972, p.104-114] MP 1024 Forces on an ice boom in the Beauharnois Canal [1975, p.397-407] SR 85-18	Pastteplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] MP 1980 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] CR 83-10 Computer models for two-dimensional steady-state heat conduction (1983, 90p.) CR 83-10 Comparative field testing of buried utility locators [1984, 25p.] MP 1977 Simple design procedure for heat transmission system piping (1985, p.451-456) MP 1979 Heat recovery from primary effluent using heat pumps (1985, p.199-203) MP 1978 Pitelka, F.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pottla, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Pound, C.E. Land treatment: present status, future prospects [1978, p.98-102] MP 1417 Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-198] MP 1510 Snowpack estimation in the St. John River basin (1980, p.467-486) MP 1799 Powers, D. Experiments on thermal convection in snow [1985, p.10,641-10,649] Powers, D.J. Thermal convection in snow [1985, 61p.) CR 85-69 Pract, B.	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Soa Experiment (1974, 197p.) MP 1833 Ice dynamics in the Canadian Archipelage and adjacent Archice basin as determined by ERTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramsesurt, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Rams, J.H. USA CRREL shallow drill (1976, p.133-137) Ross Ice Shelf Project drilling, October-December 1976 (1977, p.150-152) Danish deep drill; progress report: Pebruary-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase 1: casing operation (1980, 18p.) New 2 and 3 inch diameter CRREL snow samplers: 1980, p.199-200; CRREL 2-inch fraxil ice sampler (1982, 8p.) ER 2-49 Developing a water well for the ice backfilling of DYE-2 (1982, 19p.) Simple boom assembly for the shipboard deployment of sirses interaction instruments (1983, 14p.) SR 83-28 Operation of the U.S. Combat Support Boat (USCSBMK I) on an ice-covered waterway (1984, 28p.) ME 1977 Simple boom assembly for the shipboard deployment of sirses interaction instruments (1983, 14p.) SR 84-85 Method of detecting voids in rubbled ice (1984, p.183-183, MP 1772 Simple boom assembly for the shipboard deployment of sir-
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.H., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pasterson, C.A. Turbulent heat flux from Arctic leads (1979, p.57-91) MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payne, J.O., Jr. Full-depth and granular base course design for frost areas (1983, p.27-39) MP 1492 Passent, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions (1979, 21p.) CR 79-18 Peck, L. Review of methods for generating synthetic seismograms (1985, 39p.) Messurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks (1985, p.7827-7836) MP 2052 Peirent, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities (1985, 49p.) SR 85-11 Penner, E. Designing for frost heave conditions (1984, p.22-44) MP 1705 Perham, R.E. Ice forces on vertical piles (1972, p.104-114) MP 1024 Porces on an ice boom in the Beauharnois Canal (1975, p.397-407) CR 77-04 Ice forces on vertical piles (1977, 9p.) CR 77-05 Ice forces on vertical piles (1977, 9p.) CR 77-10 Some economic benefits of ice booms (1977, p.570-591) MP 259	Pasttaplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1982, 20p.] MP 1950 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1983, 90p.] Computer models for two-dimensional steady-state heat conduction [1983, 90p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] MP 1977 Simplified design procedures for heat transmission system piping [1985, p.451-456] MP 1979 Heat recovery from primary effluent using heat pumps [1985, p.199-203] MP 1979 Pitalka, R.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pottle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peund, C.E. Land treatment: present status, future prospects [1978, p.98-102, MP 1417 Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-199] Power, J.M. Snow cover stimation in the St. John River basin (1980, p.467-486) MP 1510 Snowpack estimation in the St. John River basin (1980, p.467-486) MP 1979 Powers, D. Raperiments on thermal convection in snow [1985, p.10,641-10,649] Powers, D.J. Thermal convection in snow [1985, 61p.) CR 85-99 Prestt, B. Deicing a satellite communication antenna [1980, 14p.]	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by BRTS-1 observations (1975, p.853-877) MP 1983 Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramcourt, E.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Rmd, J.H. USA CRRBL shallow drill (1976, p.133-137) Ross Ice Shelf Project drilling, October-December 1976 (1977, p.150-152) Danish deep drill; progress report: February-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase I: casing operation (1980, 18p.) New 2 and 3 inch diameter CRRBL snow samplers :1980, p.199-200, MP 1430 CRRBL 2-inch frazil ice sampler (1982, 8p.) Developing a water well for the ice backfilling of DYE-2 (1982, 19p.) Simple boom assembly for the shipboard deployment of sinese interaction instruments (1984, p.18). SR 83-28 Method of detecting voids in rubbled ice (1984, p.183-188) MP 1772 Simple boom assembly for the shipboard deployment of airsea interaction instruments (1984, p.227-237)
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pasteso, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payse, J.O., Jr. Pull-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passist, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] CR 85-10 Measurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052 Pelrent, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peaner, E. Designing for frost heave conditions [1984, p.22-44] MP 1024 Porces on an ice booms in the Beauharnois Canal [1975, p.397-407] MP 385 St. Marya River ice booms. Design force estimate and field measurements [1977, 26p.] CR 77-94 Ice forces on vertical piles [1977, p.] Some economic benefits of ice booms [1977, p.570-591] MP 959 Ice and ship effects on the St. Marya River ice booms [1978, p.222-230] MP 1617	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] Computer models for two-dimensional steady-state heat conduction (1983, 90p.) Comparative field testing of buried utility locators [1984, 25p.] Comparative field testing of buried utility locators [1984, 25p.] Simplified design procedure for heat transmission system piping [1985, p.179-203] Heat recovery from primary effluent using heat pumps [1985, p.199-203] Pitelka, F.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 1973 Pitelka, F.A. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] Found, C.E. Land treatment: present status, future prospects [1978, p.98-102] Snowpack estimation in the St. John River basin (1980, p.467-486) Powers, D. Experiments on thermal convection in snow [1985, p.43-47] Theory of natural convection in snow [1985, p.10,641-10,649] Prest, B. Deicing a satellite communication antenna [1980, 14p.) SR 80-18 Price, A.G.	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1833 Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramsesert, K.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Ramd, J.H. USA CRREL shallow drill (1976, p.133-137) Ross Ice Shelf Project drilling. October-December 1976 (1977, p.150-152) Danish deep drill; progress report: Pebruary-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase 1: casing operation (1980, 18p.) Nev 2 and 3 inch diameter CRREL snow samplers: 1980, p.199-200, CRREL 2-inch fraxil ice sampler (1982, 8p.) Ex 8-249 Developing a water well for the ice backfilling of DYE-2 (1982, 19p.) SR 83-28 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway (1984, 28p.) SR 83-28 Method of detecting voids in rubbled ice (1984, p.183-188) MP 1772 Simple boom assembly for the shipboard deployment of sirses interaction instruments (1984, p.27-237) MP 1752 Ice drilling and coring systems—a retrospective view (1984, p.183-188). MP 1772 Simple boom assembly for the aniphoard deployment of sirses interaction instruments (1984, p.227-237) MP 1752 Ice drilling and coring systems—a retrospective view (1984, p.184,
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Paulsea, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460] MP 1479 Payne, J.O., Jr. Pull-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passiat, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] Messurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052 Peirsent, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Penner, E. Designing for frost heave conditions [1984, p.22-44] MP 1024 Porces on an ice boom in the Beaubsrnois Canal [1975, p.397-407] MP 858 St. Marys River ice booms. Design force estimate and field messurements [1977, 26p.] CR 77-18 Some economic benefits of ice booms [1977, p.570-591]. MP 989 Ice and ship effects on the St. Marys River ice booms [1978, MP 1617 Righting moment in a rectangular ice boom timber or pontoon	Pasttaplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] SR 82-10 Analysis of heat losses from the central heat distribution system at Port Wainwright [1982, 20p.] MP 1950 Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] MP 1976 Computer models for two-dimensional steady-state heat conduction [1983, 90p.] MP 1977 Simple design procedure for heat transmission system piping [1985, p.1748-1752] MP 1977 Simplified design procedures for heat transmission system piping [1985, p.451-456] MP 1979 Heat recovery from primary effluent using heat pumps [1985, p.199-203] MP 1979 Pitalka, R.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 943 Pottle, D.S. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peund, C.E. Land treatment: present status, future prospects [1978, p.98-102] Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-199] Power, J.M. Snow cover mapping in northern Maine using LANDSAT digital processing techniques [1979, p.197-199] Power, J.M. Snow cover stimation in the St. John River basin (1980, p.467-486) MP 1799 Powers, D. Raperiments on thermal convection in snow [1985, p.43-47] Theory of natural convection in snow [1985, p.10,641-10,649] Powers, D.J. Thermal convection in snow [1985, 61p.) CR 85-99 Pratt, B. Deicing a satellite communication antenna [1980, 14p.) SR 80-18 Price, A.G. Beergy balance and runoff from a subarctic snowpack [1976,	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-65) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by BRTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramocert, K.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Rmd, J.H. USA CRRBL shallow drill (1976, p.133-137) Ross Ice Shelf Project drilling, October-December 1976 (1977, p.150-152) Danish deep drill; progress report: February-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase I: casing operation (1980, 18p.) Nev 2 and 3 inch diameter CRRBL snow samplers :1980, p.199-200, MP 1430 CRRBL 2-inch frazil ice sampler (1982, 8p.) Developing a water well for the ice beckfilling of DYE-2 (1982, 19p.) Simple boom assembly for the shipboard deployment of sines interaction instruments (1983, 14p.) Simple boom assembly for the shipboard deployment of sines interaction instruments (1984, p.183, 183-28) Method of detecting voids in rubbled ice (1984, p.183-188) MP 1772 Simple boom assembly for the shipboard deployment of sines interaction instruments (1984, p.227-237) MP 1752 Ice drilling and coring systems—a retrospective view (1984, p.125-127) MP 1999
Regelation and the deformation of wet snow [1978, p.639-650] MP 1172 Patrick, W.El., Jr. Water movement in a land treatment system of wastewater by overland flow (1979, p.185-206) MP 1283 Nitrogen transformations in a simulated overland flow wastewater treatment system [1980, 33p.] SR 80-16 Patterson, W.A., III Tussock replacement as a means of stabilizing fire breaks in tundra vegetation [1981, p.188-189] MP 1894 Pasteso, C.A. Turbulent heat flux from Arctic leads [1979, p.57-91] MP 1340 Observations of condensate profiles over Arctic leads with a hot-film anemometer [1981, p.437-460) MP 1479 Payse, J.O., Jr. Pull-depth and granular base course design for frost areas [1983, p.27-39] MP 1492 Passist, D.A. Insulating and load-supporting properties of sulfur foam for expedient roads in cold regions [1979, 21p.] Peck, L. Review of methods for generating synthetic seismograms [1985, 39p.] CR 85-10 Measurement of the resistance of imperfectly elastic rock to the propagation of tensile cracks [1985, p.7827-7836] MP 2052 Pelrent, R. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] SR 85-11 Peaner, E. Designing for frost heave conditions [1984, p.22-44] MP 1024 Porces on an ice booms in the Beauharnois Canal [1975, p.397-407] MP 385 St. Marya River ice booms. Design force estimate and field measurements [1977, 26p.] CR 77-94 Ice forces on vertical piles [1977, p.] Some economic benefits of ice booms [1977, p.570-591] MP 959 Ice and ship effects on the St. Marya River ice booms [1978, p.222-230] MP 1617	MP 2021 Phettsplace, G.E. Evaluating the heat pump alternative for heating enclosed wastewater treatment facilities in cold regions [1932, 23p.] Analysis of heat losses from the central heat distribution system at Fort Wainwright [1982, 20p.] Heating enclosed wastewater treatment facilities with heat pumps [1982, 20p.] Computer models for two-dimensional steady-state heat conduction (1983, 90p.) Comparative field testing of buried utility locators [1984, 25p.] Comparative field testing of buried utility locators [1984, 25p.] Simplified design procedure for heat transmission system piping [1985, p.179-203] Heat recovery from primary effluent using heat pumps [1985, p.199-203] Pitelka, F.A. Word model of the Barrow ecosystem [1970, p.41-43] MP 1973 Pitelka, F.A. Prevention of freezing and other cold weather problems at wastewater treatment facilities [1985, 49p.] Found, C.E. Land treatment: present status, future prospects [1978, p.98-102] Snowpack estimation in the St. John River basin (1980, p.467-486) Powers, D. Experiments on thermal convection in snow [1985, p.43-47] Theory of natural convection in snow [1985, p.10,641-10,649] Prest, B. Deicing a satellite communication antenna [1980, 14p.) SR 80-18 Price, A.G.	Ratkovskii, TU.V. Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337 Sea ice on bottom of Ross Ice Shelf (1979, p.65-66) MP 1336 Ramseler, R.O. Growth and mechanical properties of river and lake ice (1972, 243p.) Results of the US contribution to the Joint US/USSR Bering Sea Experiment (1974, 197p.) MP 1833 Ice dynamics in the Canadian Archipelage and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Ramsesert, K.L. Reliable, inexpensive radio telemetry system for the transfer of meteorological and atmospheric data from mountain-top sites (1986, 6p.) Ramd, J.H. USA CRREL shallow drill (1976, p.133-137) Ross Ice Shelf Project drilling. October-December 1976 (1977, p.150-152) Danish deep drill; progress report: Pebruary-March 1979 (1980, 37p.) 1979 Greenland Ice Sheet Program. Phase 1: casing operation (1980, 18p.) Nev 2 and 3 inch diameter CRREL snow samplers: 1980, p.199-200, CRREL 2-inch fraxil ice sampler (1982, 8p.) Ex 8-249 Developing a water well for the ice backfilling of DYE-2 (1982, 19p.) SR 83-28 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway (1984, 28p.) SR 83-28 Method of detecting voids in rubbled ice (1984, p.183-188) MP 1772 Simple boom assembly for the shipboard deployment of sirses interaction instruments (1984, p.27-237) MP 1752 Ice drilling and coring systems—a retrospective view (1984, p.183-188). MP 1772 Simple boom assembly for the aniphoard deployment of sirses interaction instruments (1984, p.227-237) MP 1752 Ice drilling and coring systems—a retrospective view (1984, p.184,

Resumesen, L.A.	Cold climate utilities manual [1986, var.p.] MP 2135	Rindge, S.D.
Continuum see ice model for a global climate model [1980,	Reid, J.R.	Utilization of sewage sludge for terrain stabilization in cold regions. Part 2 (1979, 360.) SR 79-28
p.187-196; MP 1622 Ray, M.	Shoreline erosion processes: Orwell Lake, Minnesota (1984, 101p.) CR 84-32	regions, Part 2 (1979, 36p.) SR 79-28 Utilization of sewage studge for terrain stabilization in cold
Proceedings of a Meeting on Modeling of Snow Cover Run-	Reimaitz, E.	regions. Pt. 3 [1979, 33p.] SR 79-34
off, 26-28 September 1978, Hanover, New Hampshire	Statistical aspects of ice gouging on the Alaskan Shelf of the	Revegetation at two construction sites in New Hampshire and Alaska (1980, 21p.) CR 96-03
[1979, 432p.] SR 79-36 Bearle, D.M.	Beaufort Sea [1983, 34p. + map] CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf	Alaska [1980, 21p.] CR 80-03 Chena River Lakes Project revegetation study—three-year
Statistical aspects of ice gouging on the Alaskan Shelf of the	of the Beaufort Sea [1984, p.213-236] MP 1838	summary [1981, 59p.] CR 81-18
Beaufort Sea [1983, 34p. + map] CR 83-21	Renes, J.O.	Roach, D.A. Bysied seed and standing vegetation in two adjacent types.
Some probabilistic aspects of ice gauging on the Alaskan Shelf of the Beaufort Sea [1984, p.213-236] MP 1838	Soil microbiology [1981, p.38-44] MP 1753	Buried seed and standing vegetation in two adjacent tundra habitats, northern Alaska (1983, p.359-364) MP 2064
Redfield, R.	Ricard, J. Moisture gain and its thermal consequence for common roof	Roberts, A.
CRREL is developing new snow load design criteria for the United States [1976, p.70-72] MP 947	insulations [1980, p.4-16] MP 1361	Photoelastic instrumentation—principles and techniques [1979, 153p.] SR 79-13
Update on snow load research at CRREL [1977, p.9-13]	Ricard, J.A.	Roberts, W.S.
MP 1142	Flexural strength of ice on temperate lakes—comparative tests of large cantilever and simply supported beams [1978,	Regionalized fessibility study of cold weather earthwork
Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arena roof (1979, 32p.)	14p. ₁ CR 78-69	[1976, 190p.] SR 76-02
SR 79-09	Rice, E.	Robin, G. de Q. Depth of water-filled crevasses that are closely spaced (1974).
Extending the useful life of DYE-2 to 1986, Part 1: Prelimi-	Waste management in the north [1974, p.14-21] MP 1648	p.543-544 ₁ MP 1038
nary findings and recommendations [1979, 15p.] SR 79-27	Rice, R.C., Jr.	Robinson, D.
New 2 and 3 inch diameter CRREL snow samplers [1980,	Laboratory studies of compressed air seeding of supercooled	Computer file for existing land application of wastewater sys- tems: a user's guide (1978, 24p.) SR 78-22
p.199-200 ₁ MP 1430	fog (1977, 19p.) SR 77-12 Rickmond, P.W.	Robinson, S.W.
Uniform snow loads on structures [1982, p.2781-2798] MP 1574	Influence of nose shape and L/D ratio on projectile penetra-	Buried valleys as a possible determinant of the distribution of
Analysis of roof snow load case studies; uniform loads (1983,	tion in frozen soil [1980, 21p.] SR 80-17	deeply buried permafrost on the continental shelf of the Beaufort Sea (1979, p.135-141) MP 1288
29p. ₁ CR #3-01	Dynamic testing of free field stress gages in frozen soil [1980, 26p.] SR 89-30	Roeloffs, E.A.
Ground snow loads for structural design [1983, p.950-964] MP 1734	Impact fuse performance in snow (Initial evaluation of a new	Measurements of radar wave speeds in polar glaciers using a
Redfield, R.K.	test technique) [1980, p.31-45] MP 1347	down-hole radar target technique (1983, p.199-208) MP 2057
Snow-Two/Smoke Week VI field experiment plan 1984,	Small caliber projectile penetration in frozen soil [1980, p.801-823] MP 1490	Geophysical survey of subglacial geology around the deep-
85p. ₃ SE 84-19 Probability models for annual extreme water-equivalent	Macroscopic view of snow deformation under a vehicle	drilling site at Dye 3, Greenland [1985, p.105-110] MP 1941
ground snow [1984, p.1153-1159] MP 1823	[1981, 20p.] SR \$1-17	Roguski, E.A.
Tank E/O sensor system performance in winter: an overview	Deceleration of projectiles in anow [1982, 29p.] CR 82-26	Ico-cratering experimenta Blair Lake, Alaska (1966, Various
[1985, 26p.] MP 2073 Reed, S.C.	Prozen soil characteristics that affect land mine functioning	pagings MP 1034 Ross, B.
Land disposal: state of the art [1973, p.229-261]	[1983, 18p.] SR 83-05	Model simulation of 20 years of northern hemisphere sea-ice
MP 1392	Effect of sessonal soil conditions on the reliability of the M15 land mine r1984, 35p.; SR 84-18	fluctuations [1984, p.170-176] MP 1767
Land treatment of wastewaters [1974, p.12-13] MIP 1036	land mine [1984, 35p.] SR 84-18 Review of antitank obstacles for winter use [1984, 12p.]	Numerical simulation of Northern Hemisphere sea ice varia- bility, 1951-1980 (1985, p.4847-4865) MP 1882
Land treatment of wastewaters for rural communities (1975,	CR 84-25	bility, 1951-1980 _[1985, p.4847-4865] MP 1882 Ross, D.B.
p.23-39 ₃ MP 1399	Conventional land mines in winter: Emplacement in frozen	Results of the US contribution to the Joint US/USSR Bering
Field performance of a subarctic utilidor [1977, p.448-468] MP 936	soil, use of trip wires and effect of freezing rain [1984, 23p.] SR 84-30	Sea Experiment [1974, 197p.] MP 1032
Municipal sludge management: environmental factors	23p.; Thermal analysis of a shallow utilidor [1986, 10p.; MP 2021	Ross, M.D. Direct filtration of streamborne elecial silt +1982 17n :
[1977, Var. p.] MP 1406		Direct filtration of streamborne glacial silt [1982, 17p.] CR 82-23
Ross Ice Shelf Project environmental impact statement July, 1974 [1978, p.7-36] MIP 1075	Richter, J.A. Summary of the strength and modulus of ice samples from	Rethreck, D.A.
Land treatment: present status, future prospects (1978, p.98-	multi-year pressure ridges (1984, p.126-133)	Science program for ar imaging radar receiving station in Alaska [1983, 45p.] MP 1884
102 ₁ MP 1417	MP 1679	Rutford, R.H.
Cold climate utilities delivery design manual [1979, c300 leaves] MP 1373	Preliminary examination of the effect of structure on the com- pressive strength of ice samples from multi-year pressure	Ross Ice Shelf Project environmental impact statement July,
Health aspects of water reuse in California [1979, p.434-	ridges (1984, p.140-144) MIP 1685	1974 [1978, p.7-36] MP 1075 Ryan, J.R.
435 ₁ MP 1464	On small-scale horizontal variations of salinity in first-year sea ice (1984, p.6505-6514) MIP 1761	Site selection methodology for the land treatment of wastewa-
Cost-effective use of municipal wastewater treatment ponds f1979, p.177-200; MP 1413	Summary of the strength and modulus of ice samples from	ter [1981, 74p.] SIR 81-28
Health aspects of land treatment [1979, 43p.] MP 1389	multi-year pressure ridges [1985, p.93-98] MP 1848	Ryan, W.L.
Cost of land treatment systems [1979, 135p.] MP 1387	Preliminary examination of the effect of structure on the com- pressive strength of ice samples from multi-year pressure	On-site utility services for remote military facilities in the cold regions (1984, 66p.) SR 84-14
EPA policy on land treatment and the Clean Water Act of 1977 [1980, p.452-460] MP 1418	ridges (1985, p.99-102) MP 1849	Ryden, J.C.
Aquaculture systems for wastewater treatment: an engineer-	Richter-Menge, J.A.	Evaluation of a simple model for predicting phosphorus re- moval by soils during land treatment of wastewater (1982,
ing assessment [1980, 127p.] MP 1422	Mechanical properties of multi-year sea ice. Phase 1: Test results [1984, 105p.] CR 84-09	12p. ₁ SR 82-14
Engineering assessment of squaculture systems for wastewater treatment: an overview (1980, p.1-12) MP 1423	Static determination of Young's modulus in sea ice [1984,	Sahourin, L.
Energy and costs for agricultural reuse of wastewater [1980,	p.283-286 ₁ MP 1789	Fracture behavior of ice in Charpy impact testing [1980,
p.339-3461 MP 1461 Aquaculture for wastewater treatment in cold climates	Structure, salinity and density of multi-year sea ice pressure ridges [1985, p.194-198] MP 1857	Salemenson, V.V.
(1981, p.482-492) MP 1394	Tensile strength of multi-year pressure ridge sea ice samples	Landsat-4 thematic mapper (TM) for cold environments
Incidental agriculture reuse application associated with land	[1985, p.186-193] MP 1856	[1983, p.179-186] MP 1651 Sangar, F.J.
treatment of wastewater—research needs [1982, p.91- 123] MP 1947	Effect of sample orientation on the compressive strength of multi-year pressure ridge ice samples (1985, p.465-475)	Thermal and rheological computations for artificially frozen
Design, operation and maintenance of land application sys-	MP 1877	ground construction [1978, p.95-117] MIP 1624
tems for low cost wastewater treatment [1983, 26p. + figs.] MP 1946	Triaxial compression testing of ice [1985, p.476-488] MP 1878	Thermal and rheological computations for artificially frozen ground construction [1979, p.311-337] MP 1227
Nitrogen removal in wastzwater stabilization ponds (1983,	Mechanical properties of multi-year pressure ridge samples	Designing for frost heave conditions (1984, p.22-44)
13p. + figs. ₁ MP 1943	[1985, p.244-251] MP 1936	MP 1705
Engineering systems [1983, p.409-417] MP 1948 Accumulation, characterization, and stabilization of studges	Tensile strength of multi-year pressure ridge sea ice samples [1985, p.375-380] MP 1908	Senteford, H.S. High-latitude basins as settings for circumpolar environmen-
for cold regions lagoons [1984, 40p.] Six 84-06	Mechanical properties of multi-year sea ice. Phase 2: Test	tal studies (1975, p.IV/57-IV/68) MIP 917
On-site utility services for remote military facilities in the cold	results [1985, 81p.] CR 85-16	Sergent, B.C
regions [1984, 66p.] SR 84-14 Water supply and waste disposal on permanent snow fields	Structure, salinity and density of multi-year sea ice pressure ridges [1985, p.493-497] MP 1965	Energy conservation at the West Dover, Vermont, water pol- lution control facility [1982, 18p.] SR 82-24
[1984, p.401-413] MP 1714	Confined compressive strength of multi-year pressure ridge	Seter, J.E.
Nitrogen removal in wastewater ponds [1984, 26p.] CR \$4-13	sea ice samples [1986, p.365-373] MP 2635	Analysis of environmental factors affecting army operations in the Arctic Basin (1962, 11p.) MP 984
Problems with rapid infiltration—a post mortem analysis	Comparison of two constitutive theories for compressive deformation of columnar sea ice [1986, p.241-252]	in the Arctic Basin (1962, 11p.) MP 984 Satterwhite, M.B.
[1984, 17p. + figs.] MP 1944	MP 2124	Rapid infiltration of primary sewage effluent at Fort Devens,
Wetlands for wastewater treatment in cold climates 1984,	Richter, W.A. Furtheries of Valentin MissesCORA Assessment Sounding	Massachusetts [1976, 34p.] CR 76-48
9p. + figs.; MP 1945 Maintaining frosty facilities [1985, p.9-15; MP 1949	Evaluation of Vaisala's MicroCORA Automatic Sounding System [1982, 17p.] CR 82-28	Treatment of primary sewage effluent by rapid infiltration [1976, 15p.] CR 76-49
Water supply and waste disposal on permanent snowfields	Riley, J.	Sayles, F.H.
(1985, p.344-350) MP 1792	Mesoscale measurement of snow-cover properties (1973,	Thermal and rheological computations for artificially frozen ground construction r1978, p.95-1171 MP 1624
Cold weather O&M (1985, p.10-15) MP 2076 Prevention of freezing and other cold weather problems at	p.624-643 ₁ MP 1029 Riley, E.W.	ground construction [1978, p.95-117] MP 1624 Thermal and rheological computations for artificially frozen
wastewater treatment facilities [1985, 49p.] SR 85-11	Bank recession and channel changes in the area near the	ground construction (1979, p.311-337) MIP 1227
Nitrogen removal in cold regions trickling filter systems [1986, 39p.] SR 86-02	North Pole and floodway sill groits, Tanana River, Alaska [1984, 98p.] MP 1747	General report session 2: mechanical properties [1979, p.7- 181 MP 1726
(1704) 37P-] SK 80-0%	(1.20-4, 20)-] MLF 1/4/	10) MET 1/20

	5 · · • • •	The state of the s
Strength of frozen silt as a function of ice content and dry unit	Scott, W.J. Airborne E-phase resistivity surveys of permafrost - central	Regional distribution and characteristics of bottom sediments in Arctic coastal waters of Alaska [1980, 50p.]
weight (1980, p.109-119) MP 1451	Alaska and Mackenzie River areas [1974, p.67-71]	SR 90-15
Regulated set concrete for cold weather construction (1980,	MP 1846	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1981, p.125-157] MP 1428
p.291-314 ₁ MP 1359 Excevation of frozen materials (1980, p.323-345 ₁	Geophysics in the study of permafrost [1979, p.93-115] MP 1266	Hyperbolic reflections on Beaufort Sea seismic records
MP 1360	Sector, P.W.	[1981, 16p.] CR 81-62
Embankment dams on permafrost in the USSR [1980, 59p.]	Ice engineering facility heated with a central heat pump sys- tem (1977, 4p.) MP 939	Delineation and engineering characteristics of permafrost beneath the Beaufort Ses (1981, p.137-156) MP 1600
SR 10-41	Demonstration of building heating with a heat pump using	Improving electric grounding in frozen materials (1982,
Acoustic emissions during crosp of frozen soils (1982, p.194- 206) MP 1495	thermal effluent [1977, 24p.] SR 77-11	12p. ₁ SR 82-13
Mitigative and remedial measures for chilled pipelines in dis-	Study of water drainage from columns of snow [1979, 19p.]	Subses permafrost in Harrison Bay, Alaska: an interpretation from seismic data [1982, 62p.] CR 82-24
continuous permafrost (1984, p.61-62) MP 1974 Design and performance of water-retaining embankments in	CR 79-01	Radar profiling of buried reflectors and the groundwater table
permafrost [1984, p.31-42] MP 1850	Soltm, H.M.	[1983, 16p.] CR 83-11
Foundations in permafrost and seasonal frost; Proceedings	Nitrogen behavior in land treatment of wastewater: a simpli- fied model (1978, p.171-179) MP 1149	Seismic velocities and subsca permafrost in the Beaufort Sea, Alaska (1983, p.894-898) MP 1665
[1985, 62p.] MP 1730	Evaluation of N models for prediction of No3-N in percolate	Conductive backfill for improving electrical grounding in
Creep of a strip footing on ice-rich permafrost [1985, p.29-51] MP 1731	water in land treatment [1978, p.163-169] MP 1148	frozen soils [1984, 19p.] SR 84-17
Saylor, C.P.	Simplified model for prediction of nitrogen behavior in land treatment of wastewater [1980, 49p.] CR 80-12	Subses permafrost distribution on the Alaskan shelf [1984, p.75-82] MP 1852
Report on ice fall from clear sky in Georgia October 26, 1959 [1960, 31p. plus photographs] MP 1017	Modeling nitrogen transport and transformations in soils: 1.	Determining distribution patterns of ice-bonded permafrost in
Seyward, J.M.	Theoretical considerations [1981, p.233-241] MP 1440	the U.S. Beaufort Sea from seismic data [1984, p.237-
Evaluation of MESL membrane—puncture, stiffness, temper-	Modeling nitrogen transport and transformations in soils: 2.	258 ₁ MP 1839 loe drilling and coring systems—a retrospective view [1984,
ature, solvents (1976, 60p.) CR 76-22	Validation [1981, p.303-312] MP 1441	p.125-127 ₁ MP 1999
Small-scale testing of soils for frost action [1979, p.223-231] MP 1309	Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2051	Mapping resistive seabed features using DC methods [1985,
Seeking low ice adhesion [1979, 83p.] SR 79-11	WASTEN: a model for nitrogen behaviour in soils irrigated	p.136-147 ₁ MP 1918
Small-scale testing of soils for frost action and water migration	with liquid waste [1984, p.96-108] MP 1762	Galvanic methods for mapping resistive seabed features [1985, p.91-92] MIP 1955
(1979, 17 p.) SE 79-17	Sellmann, P.V. Airborne E-phase resistivity surveys of permafrost - central	Some aspects of interpreting seismic data for information on
Salt action on concrete [1984, 69p.] SR 84-25	Alaska and Mackenzie River areas [1974, p.67-71]	shallow subsea permafrost (1985, p.61-65) MP 1954
Schaufer, D. Protected membrane roofs in cold regions (1976, 27p.) CR 76-02	MP 1046	Session (etc.) Foundations in Permufrost and Sessenal Frest, Denver, CO, Apr. 29, 1985
CR 76-02	Snow accumulation for arctic freshwater supplies (1975, p.218-224) NIP 860	Foundations in permafrost and sessonal frost; Proceedings
Water absorption of insulation in protected membrane roofing	Delineation and engineering characteristics of permafrost	(1985, 62p.) MP 1750
systems [1976, 15p.] CR 76-38 Observation and analysis of protected membrane roofing sys-	beneath the Beaufort Sea [1976, p.391-408] MP 1377	Sexstens, A. Pate of crude and refined oils in North Slope soils [1978,
tems [1977, 40p.] CR 77-11	General considerations for drill system design [1976, p.77- 111] MP 856	p.339-347 ₁ MP 1186
Installation of loose-laid inverted roof system at Fort Wain-	Operational report: 1976 USACRREL-USGS subsea perma-	Shehin, M.Y.
wright, Alaska [1977, 27p.] SR 77-18 Scheeh, S.A.	frost program Beaufort Sea, Alaska [1976, 20p.] SR 76-12	Projected thermal and load-associated distress in pavements incorporating different grades of asphalt cement (1978,
Microbiological serosols from a field source during sprinkler	Airborne resistivity and magnetometer survey in northern	p.403-437 ₁ MP 1209
irrigation with wastewater [1978, p.273-280]	Maine for obtaining information on bedrock geology	Asphalt concrete for cold regions; a comparative laboratory
MP 1154	[1976, 19p.] CR 76-37 Delineation and engineering characteristics of permafrost	study and analysis of mixtures containing soft and hard grades of asphalt cement (1980, 55p.) CR 80-05
Bacterial serosols from a field source during multiple-sprin- kler irrigation: Deer Croek Lake State Park, Ohio 1979,	beneath the Beaufort Sea [1976, p.53-60] MP 919	Shever, G.R.
64p. ₃ SR 79-32	Selected examples of radiohm resistivity surveys for geotech-	Growth and flowering of cottongrass tussocks along a climatic
Microbiological aerosols from a field-source wastewater irrigation system (1983, p.65-75) MP 1578	nical exploration [1977, 16p.] SR 77-01 Delineation and engineering characteristics of permafrost	transect in northcentral Alaska [1984, p.10-11] MP 1950
Schertler, R.J.	beneath the Beaufort Sea (1977, p.234-237) MP 927	Shew, K.A.
Ground-truth observations of ice-covered North Slope lakes	Delineation and engineering characteristics of permafrost	Compression of wet snow [1978, 17p.] CR 78-10
images by radar [1981, 17p.] CR 81-19	beneath the Beaufort Sea [1977, p.385-395] MP 1074 Interesting features of radar imagery of ice-covered North	Sheehy, W.
Schmagge, T.J. Survey of methods for soil moisture determination (1979),	Slope lakes [1977, p.129-136] MP 923	On the origin of stratified debris in ice cores from the bottom of the Antarctic ice sheet (1979, p.185-192)
74p. ₁ MP 1639	Preliminary evaluation of new LF radiowave and magnetic	MP 1272
Schneiter, R.W.	induction resistivity units over permafrost terrain [1977, p.39-42] MIP 925	Shemdta, O.H.
Lime stabilization and land disposal of cold region wastewater lagoon sludge (1982, p.207-213) MP 1696	Delinantian and analysesing characteristics of competent	Inlet current measured with Seasat-1 synthetic aperture radar
	Delineation and engineering characteristics of permafrost	
Accumulation, characterization, and stabilization of sludges	beneath the Beaufort Sea [1977, p.432-440] MIP 1077	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic aperture radar
for cold regions lagoons (1984, 40p.) SR 84-06	beneath the Beaufort Sea (1977, p.432-440) MP 1077 1977 CRREL-USGS permafrost program Beaufort Sea, Alse-	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic aperture radar [1980, p.35-37] MP 1481
for cold regions lagoons (1984, 40p.) SR 84-06 Schraeder, R.L.	beneath the Beaufort Sea (1977, p.432-440) MP 1977 1977 CRREL-USGS permatrost program Beaufort Sea, Alsa- ka, operational report (1977, 19p.) Delineation and engineering characteristics of permafrost	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic aperture radar [1980, p.35-37] MP 1481 Shen, H.
for cold regions lagoons (1984, 40p.) SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques (1979, 75p.)	beneath the Beaufort Sea (1977, p.432-440) MP 1977 1977 CRREL-USGS permatrost program Beaufort Sea, Alsay, operational report (1977, 199.) Belineation and engineering characteristics of permatrost beneath the Beaufort Sea (1977, p.518-521) MP 1201	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic aperture radar [1980, p.35-37] MP 1481
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-10	beneath the Beaufort Sea (1977, p.432-440) MP 1977 1977 CRREL-USGS permatrost program Beaufort Sea, Alsa- ka, operational report (1977, 19p.) Delineation and engineering characteristics of permafrost	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar [1980, p.35-37] MP 1481 Shen, H. On the rheology of a broken ice field due to floe collision [1984, p.29-34] MP 1812 Shen, H.H.
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-10 Schalsen, E.M.	beneath the Beaufort Sea [1977, p.432-440] MP 1977 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Regineering properties of subsea permafrost in the Prudhoe	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic aperture radar [1980, p.35-37] MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision [1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, sim-
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-10	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRREL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1201 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] SR 78-94	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic aperture rade [1980, p.35-37] MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision [1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes [1985, 18p.; CR 85-02
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] Schulsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schumacher, P.W.	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 198.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline [1978, 239.] Regineering properties of subsea permafrost in the Packet Sea [1978, p.629-635, MP 1104 Shallow electromagnetic geophysical investigations of perma-	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials.
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-10 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] CR 83-14 Schausscher, P.W. Microbiological scrosols from a field source during sprinkler	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRREL-USGS permafrost program Beaufort Sea, Alsa- ka, operational report [1977, 198-] SR 77-41 Delineation and engineering characteristics of permafrost Large mobile drilling rigs used along the Alaska pipeline [1978, 23p-] SR 78-04 Bagineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] MP 1101	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37] MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain ple shear flow of granular materials. Part 2. Multiple grain
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] Schulsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schumacher, P.W.	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1291 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Bagineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507) Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Constitutive relations for a planar, simple shear flow of rough
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schaises, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells;	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1291 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Bagineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507) Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 20p.) CR 85-03 Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.)
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978,	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1201 Large mobile drilling rigs used along the Alaska pipeline SR 78-04 Regineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permaforst beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 20p.) CR 85-03 Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.)
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-10 Schaisen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] CR 83-14 Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] Becterial serosols from a field source during multiple-sprin-	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRREL-USGS permafrost program Beaufort Sea, Alsaka, operational report [1977, 198-3] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] Large mobile drilling rigs used along the Alaska pipeline [1978, 23p-3] Engineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] MP 1101 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] MP 1211	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) Shea, H.T. Mechanics of ice jam formation in rivers [1983, 14p.] CR 83-31
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schalsen, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] Becterial aerosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979,	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 198.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline SR 78-04 Regineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635, MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permaforst beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115, MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493, MP 1210-1848] Penetration tests in subsea permafrost, Prudhoe Bay, Alaska	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar [1980, p.35-37] MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision [1984, p.29-34] MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes [1985, 18p.] Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain ple shear flow of granular materials. Part 2. Multiple grain sizes [1985, 20p.] Constitutive relations for a planar, simple shear flow of rough disks [1985, 17p.] Shea, H.T. Mechanics of ice jam formation in rivers [1983, 14p.] CR 83-31 St. Lawrence River freeze-up forecast [1984, p.177-190]
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-10 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater (1978, p.273-280) MP 1154 Five-year performance of CRRBL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] SR 78-26 Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] SR 79-32	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRREL-USGS permafrost program Beaufort Sea, Alsaka, operational report [1977, 198-3] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] Large mobile drilling rigs used along the Alaska pipeline [1978, 23p-3] Engineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] MP 1101 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] MP 1211	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) Shea, H.T. Mechanics of ice jam formation in rivers (1983, 14p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190) MP 1713
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] Bacterial aerosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] SR 79-32 Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.]	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rign used along the Alaska pipeline [1978, 23p.] Regineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635, MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115, MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493, MP 1271 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska [1979, 45p.] Electromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.) SR 79-14	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar [1980, p.35-37] MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision [1984, p.29-34] MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes [1985, 18p.] Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain ple shear flow of granular materials. Part 2. Multiple grain sizes [1985, 20p.] Constitutive relations for a planar, simple shear flow of rough disks [1985, 17p.] Shea, H.T. Mechanics of ice jam formation in rivers [1983, 14p.] CR 83-31 St. Lawrence River freeze-up forecast [1984, p.177-190]
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-10 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] CR 83-14 Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] SR 78-26 Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] SR 79-32 Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irri-	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 198-3] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1201 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Bagineering properties of subsea permafrost in the Prudhos Bay region of the Beaufort Sea [1978, p.529-635] MP 1104 Shallow electromagnetic geophysical investigations of permarkost [1978, p.501-507] Delineation and engineering characteristics of permarkost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] MP 1211 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska [1979, 45p.] CR 79-07 Blectromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.] Field methods and preliminary results from subsea permafrost	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple ahear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 85-20 Shea, H.T. Mechanics of ice jam formation in rivers [1983, 14p.] CR 83-31 St. Lawrence River freeze-up forecast [1984, p.177-190] MP 1713 Forecasting water temperature decline and freeze-up in rivers [1984, 17p.] Computer simulation of ice cover formation in the Upper St.
for cold regions lagoons [1984, 40p.] SR 24-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schalsen, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] MP 1578	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1201 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Begineering properties of subsea permafrost in the Properties of subsea permafrost in the Properties of St. 78-04 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] Penetration tests in subsea permafrost, Prudhoe Bay, Alaska (1979, 45p.) Electromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, p.9] Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska (1979, p.207-1213) MP 1591	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Cn stitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 85-20 Shea, H.T. Mechanics of ice jam formation in rivers [1983, 14p.) CR 83-31 St. Lawrence River freeze-up forecast [1984, p.177-190, MP 1713 Porecasting water temperature decline and freeze-up in rivers [1984, 17p.) Cm 94-1994, 17p.) Cm 94-1944, 17p.) Cm 94-1944, 17p.) Cm 1814
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-10 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] CR 83-14 Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] SR 78-26 Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] SR 79-32 Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.]	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Sea of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] MP 1211 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska [1979, 45p.] Sectionagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.] Fleid methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska [1979, p.207-213] Determining subsea permafrost characteristics with a cone	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 85-03 Shea, H.T. Mechanics of ice jam formation in rivers (1983, 14p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190) MP 1713 Forecasting water temperature decline and freeze-up in rivers (1984, 17p.) Computer simulation of ice cover formation in the Upper St. Lawrence River (1984, p.277-245) MP 1814 Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) MP 1830
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schalsen, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280) MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] MF 1578 TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.]	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1291 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Bugineering properties of subsea permafrost in the Prudhoe Bey region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] Penetration tests in subsea permafrost, Prudhoe Bay, Alaska [1979, 45p.] Electromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.] Fleid methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska [1979, p.207-213] Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16] MP 1217	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Cn stitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 85-20 Shea, H.T. Mechanics of ice jam formation in rivers [1983, 14p.] CR 83-31 St. Lawrence River freeze-up forecast [1984, p.177-190] MP 1713 Forecasting water temperature decline and freeze-up in rivers [1984, 17p.] Computer simulation of ice cover formation in the Upper St. Lawrence River [1984, p.227-245] MP 1814 Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] Bffect of ice cover on hydropower production [1984, p.231-
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-10 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] CR 83-14 Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] SR 78-26 Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] SR 79-32 Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.]	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 198.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Regineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635, MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74, MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] Alaska [1979, p.1481-1493] Rectromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.] Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska [1979, p.207-213] Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16] MP 1211 Detection of Arctic water suppties with geophysical tech-	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic aperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) CR 85-02 Constitutive relations for a planar, simple shear flow of rough disks (1985, 7p.) Shea, H.T. Mechanics of ice jam formation in rivers (1983, 14p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190) MP 1713 Computer simulation of ice cover formation in the Upper St. Lawrence River (1984, p.272-245) MP 1814 Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) Effect of ice cover on hydropower production (1984, p.231-MP 1876) MP 1876
for cold regions lagoons [1984, 40p.] Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schauscher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280) MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] Becterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.] CR 85-15 Schaeter, R.L. Geobotanical studies on the Taku Glacier anomaly [1954, p.224-239]	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] Belineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rips used along the Alaska pipeline [1978, 23p.] Ragineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] MP 1211 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska (1979, 45p.) Electromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.) SR 79-14 Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska [1979, p.207-213] Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16] MP 1211 Detection of Arctic water supplies with geophysical techniques [1979, 30p.] CR 79-15	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 85-20 Shea, H.T. Mechanics of ice jam formation in rivers [1983, 14p.] CR 83-31 St. Lawrence River freeze-up forecast [1984, p.177-190] MP 1713 Forecasting water temperature decline and freeze-up in rivers (1984, 17p.) Cmputer simulation of ice cover formation in the Upper St. Lawrence River [1984, p.227-245] MP 1814 Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) Effect of ice cover on hydropower production [1984, p.231-234] MAP 1876 Mathematical modeling of river ice processes [1984, p.554-558]
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] SE 78-26 Bacterial aerosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] SR 79-32 Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.] CR 85-15 Schaester, R.L. Geobotanical studies on the Taku Glacier anomaly [1954, p.224-239] Schwarz, J.	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 198.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Regineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635, MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74, MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] Alaska [1979, p.1481-1493] Rectromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.] Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska [1979, p.207-213] Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16] MP 1211 Detection of Arctic water suppties with geophysical tech-	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain pizes (1985, 20p.) CR 85-02 CR 85-03 Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) Shea, H.T. Mechanics of ice jam formation in rivers (1983, 14p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190, MP 1713) Porecasting water temperature decline and freeze-up in rivers (1984, 17p.) Computer simulation of ice cover formation in the Upper St. Lawrence River (1984, p.227-245) MP 1874 Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) Effect of ice cover on hydropower production (1984, p.231-234) MP 1876 MP 1876 MP 1876 MP 1876 MP 1876 MP 1877 Unified degree-day method for river ice cover thickness simu-
for cold regions lagoons [1984, 40p.] Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schauscher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280) MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] Becterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.] CR 85-15 Schaeter, R.L. Geobotanical studies on the Taku Glacier anomaly [1954, p.224-239]	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] Belineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rips used along the Alaska pipeline [1978, 23p.] Begineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] Penetration tests in subsea permafrost, Prudhoe Bay, Alaska (1979, 45p.) Electromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.) Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska [1979, p.207-213] Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16] MP 1217 Detection of Arctic water supplies with geophysical techniques [1979, 30p.] Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost [1979, 24p.] Electromagnetic techniques and ground ice on electromagnetic surveys of permafrost [1979, 24p.] Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost [1979, 24p.] Electromagnetic values as possible determinent of the distribution of	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain size (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 85-03 Shea, H.T. Mechanics of ice jam formation in rivers (1983, 14p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190) MP 1713 Forecasting water temperature decline and freeze-up in rivers (1984, 17p.) Computer simulation of ice cover formation in the Upper St. Lawrence River (1984, p.227-245) MP 1814 Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) MP 1830 Effect of ice cover on hydropower production (1984, p.231-234) Mp 1876 Mathematical modeling of river ice processes (1984, p.354-558) Unified degree-day method for river ice cover thickness simulation (1985, p.54-62) MP 2665
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size (1983, 38p.) Schalsen, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280) MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.) SE 78-26 Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.) SR 79-32 Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.) Ricobiological serosols from a field-source wastewater irrigation system [1983, p.65-75] TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.) CR 85-15 Schaster, R.L. Geobotanical studies on the Taku Glacier anomaly [1954, p.224-239) Schwarz, J. Investigation of ice forces on vertical structures [1974, 1879.) Regioneering properties of sea ice [1977, p.499-531]	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 198.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Regineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635, MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permaforst beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] MP 1261 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska (1979, 45p.) Electromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.] Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska [1979, p.207-213] Determining subsea permafrost characteristics with a conpenetrometer—Prudhoe Bay, Alaska [1979, p.3-16] Detection of Arctic water supplies with geophysical techniques [1979, 30p.] Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost [1979, 24p.] CR 79-23	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) CR 85-02 CR 85-03 Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) Shea, H.T. Mechanics of ice jam formation in rivers (1983, 14p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190, MP 1713 Porecasting water temperature decline and freeze-up in rivers (1984, 17p.) Computer simulation of ice cover formation in the Upper St. Lawrence River (1984, p.227-245) MP 1814 Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) Effect of ice cover on hydropower production (1984, p.231-358) Unified degree-day method for river ice cover thickness simulation (1985, p.54-62) St. Lawrence River freeze-up forecast (1986, p.467-481) MP 2065 St. Lawrence River freeze-up forecast (1986, p.467-481)
for cold regions lagoons [1984, 40p.] SR 24-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] CR 23-14 Schanacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280) MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] SE 78-24 Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] SR 79-32 Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] MP 1578 TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.] CR 85-15 Schaster, R.L. Geobotanical studies on the Taku Glacier anomaly [1954, p.224-239] Schwars, J. Investigation of ice forces on vertical structures [1974, 153p.] MP 1041 Engineering properties of sea ice [1977, p.499-531] MP 1065	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] Belineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Ragineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] Penetration tests in subsea permafrost, Prudhoe Bay, Alaska (1979, 45p.) Electromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.) Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska (1979, p.207-213) Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska (1979, p.3-16) Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska (1979, p.3-16) MP 1217 Detection of Arctic water supplies with geophysical techniques (1979, 30p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) CR 85-03 Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190) MP 1713 Forecasting water temperature decline and freeze-up in rivers (1984, 17p.) Computer simulation of ice cover formation in the Upper St. Lawrence River (1984, p.227-245) MP 1814 Pield investigation of St. Lawrence River hanging ice dams (1984, p.241-249) MP 1830 Bffect of ice cover on hydropower production (1984, p.231-234) MP 1830 MP 1830 MP 1830 St. Lawrence River freeze-up forecases (1984, p.554-558) Unified degree-day method for river ice cover thickness simulation (1985, p.54-62) MP 2065 St. Lawrence River freeze-up forecast (1986, p.467-481) MP 2065 St. Lawrence River freeze-up forecast (1986, p.467-481) MP 2120 Shea, J.
for cold regions lagoons [1984, 40p.] SR 84-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size (1983, 38p.) Schalsen, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280) MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.) SE 78-26 Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.) SR 79-32 Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.) Ricobiological serosols from a field-source wastewater irrigation system [1983, p.65-75] TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.) CR 85-15 Schaster, R.L. Geobotanical studies on the Taku Glacier anomaly [1954, p.224-239) Schwarz, J. Investigation of ice forces on vertical structures [1974, 1879.) Regioneering properties of sea ice [1977, p.499-531]	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 198.] SR 77-41 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Ragineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635, MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permaforst beneath the Beaufort Sea [1978, p.50-74] MP 1206 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] Penetration tests in subsea permafrost, Prudhoe Bay, Alaska [1979, p.59.] Riedtromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.] Pield methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska [1979, p.207-213] Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16] Detection of Arctic water supplies with geophysical techniques [1979, 30p.] Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost 1979, 24p.] CR 79-23 Buried valleys as a possible determinant of the distribution of desply buried permafrost on the continental shelf of the Beaufort Sea [1979, p.33-115] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1979, p.33-115) MP 1287	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic aperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) Constitutive relations for a planar, simple shear flow of rough disks (1985, 20p.) Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 85-20 Shea, H.T. Mechanics of ice jam formation in rivers (1983, 14p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190) MP 1713 Computer simulation of ice cover formation in the Upper St. Lawrence River (1984, p.227-245) Mf 1814 Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) Mf 1834 Bffect of ice cover on hydropower production (1984, p.231-358) Unified degree-day method for river ice cover thickness simulation (1985, p.54-62) Mf 2166 Shea, J. Bibliography of literature on China's glaciers and permafrost.
for cold regions lagoons [1984, 40p.] SR 24-06 Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] SR 79-16 Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schalsen, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] Bacterial serosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] Sz 79-32 Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] MP 1578 TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.] Schaester, R.L. Geobotanical studies on the Taku Glacier anomaly [1954, p.224-239] Schwarz, J. Investigation of ice forces on vertical structures [1974, 153p.) MP 1065 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1556 Schwarz, M.J.	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] Belineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rigs used along the Alaska pipeline [1978, 23p.] Ragineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635] MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115] MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493] Penetration tests in subsea permafrost, Prudhoe Bay, Alaska (1979, 45p.) Electromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.) Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska (1979, p.207-213) Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska (1979, p.3-16) Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska (1979, p.3-16) MP 1217 Detection of Arctic water supplies with geophysical techniques (1979, 30p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979, 24p.) Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost (1979	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic sperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 20p.) CR 85-03 Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190) MP 1713 Forecasting water temperature decline and freeze-up in rivers (1984, 17p.) Computer simulation of ice cover formation in the Upper St. Lawrence River (1984, p.227-245) MP 1814 Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) MP 1830 Biffect of ice cover on hydropower production (1984, p.231-234) MP 1804 Mathematical modeling of river ice processes (1984, p.354-558) Unified degree-day method for river ice cover thickness simulation (1985, p.54-62) MP 2065 St. Lawrence River freeze-up forecast (1986, p.467-481) MP 2065 St. Lawrence River freeze-up forecast (1986, p.467-481) MP 2065 St. Lawrence River freeze-up forecast (1986, p.467-481) MP 2120 Shea, J. Bibliography of literature on China's glaciers and permafrost. Part 1: 1938-1979 (1982, 44p.) SR 220 Shook, J.F.
for cold regions lagoons [1984, 40p.] Schraeder, R.L. Rapid detection of water sources in cold regions—a selected bibliography of potential techniques [1979, 75p.] Schalsen, E.M. Study on the tensile strength of ice as a function of grain size [1983, 38p.] Schamacher, P.W. Microbiological serosols from a field source during sprinkler irrigation with wastewater [1978, p.273-280] MP 1154 Five-year performance of CRREL land treatment test cells; water quality plant yields and nutrient uptake [1978, 24p.] Bacterial aerosols from a field source during multiple-sprinkler irrigation: Deer Creek Lake State Park, Ohio [1979, 64p.] Seven-year performance of CRREL slow-rate land treatment prototypes [1981, 25p.] Microbiological serosols from a field-source wastewater irrigation system [1983, p.65-75] TNT, RDX and HMX explosives in soils and sediments. Analysis techniques and drying losses [1985, 11p.] CR 85-15 Schaester, R.L. Geobotanical studies on the Taku Glacier anomaly [1954, p.224-239] Schwarz, J. Investigation of ice forces on vertical structures [1974, p.224-239] MP 1045 Standardized teeting methods for measuring mechanical properties of ice [1981, p.245-254] MP 1556	beneath the Beaufort Sea [1977, p.432-440] MP 1077 1977 CRRBL-USGS permafrost program Beaufort Sea, Alaska, operational report [1977, 19p.] Belineation and engineering characteristics of permafrost beneath the Beaufort Sea [1977, p.518-521] MP 1261 Large mobile drilling rips used along the Alaska pipeline [1978, 23p.] Ragineering properties of subsea permafrost in the Prudhoe Bay region of the Beaufort Sea [1978, p.629-635, MP 1104 Shallow electromagnetic geophysical investigations of permafrost [1978, p.501-507] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1978, p.50-74] MP 1206 Geophysics in the study of permafrost [1979, p.93-115, MP 1266 Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska [1979, p.1481-1493, MP 1211 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska (1979, 45p.) Electromagnetic geophysical survey at an interior Alaska permafrost exposure [1979, 7p.) Field methods and preliminary results from subsea permafrost investigations in the Beaufort Sea, Alaska [1979, p.207-213] Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16] Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-15] Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska [1979, p.3-16] Effects of seasonal changes and ground ice on electromagnetic surveys of permafrost characteristics of permafrost characteristics of permafrost characteristics of permafrost characteristics of permafrost beneath the Beaufort Sea [1979, p.13-16] MP 1287 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1979, p.13-15] MP 1287 Permafrost beneath the Beaufort Sea: near Prudhoe Bay, Permafrost beneath the Beaufort Sea [1979, p.13-15]	[1980, p.35-37] MP 1443 Inlet current measured with Seasat-1 synthetic aperture radar (1980, p.35-37) MP 1481 Shea, H. On the rheology of a broken ice field due to floe collision (1984, p.29-34) MP 1812 Shea, H.H. Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 1. Two grain sizes (1985, 18p.) Effect of nonuniform size on internal stresses in a rapid, simple shear flow of granular materials. Part 2. Multiple grain sizes (1985, 20p.) CR 85-02 CR 85-03 Constitutive relations for a planar, simple shear flow of rough disks (1985, 17p.) Shea, H.T. Mechanics of ice jam formation in rivers (1983, 14p.) CR 83-31 St. Lawrence River freeze-up forecast (1984, p.177-190) MP 1713 Porecasting water temperature decline and freeze-up in rivers (1984, 17p.) Computer simulation of ice cover formation in the Upper St. Lawrence River (1984, p.227-245) MP 1814 Field investigation of St. Lawrence River hanging ice dama (1984, p.241-249) Effect of ice cover on hydropower production (1984, p.231-234) Mathematical modeling of river ice processes (1984, p.554-558) Unified degree-day method for river ice cover thickness simulation (1985, p.54-62) Shea, J. Bibliography of literature on China's glaciers and permafrost. Part 1: 1938-1979 (1982, 44p.) SR 82-20

Shekla, S.S. Limnological investigations: Lake Koocanusa, Montana. Pt.	Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962	Crushing ice forces on cylindrical structures [1984, p.1-9] MP 183
5: Phosphorus chemistry of sediments (1981, 9p.) SR 81-15	Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.]	Forces associated with ice pile-up and ride-up [1984, p.239-
Shances, C.L.	CR 78-12	262 ₁ MP 188 Structure of first-year pressure ridge sails in the Prudhoe Ba
Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska [1983, 35p.] CR 83-24	Techniques for using MESL (membrane encapsulated soil layers) in roads and sirfields in cold regions (1978, p.560-	region (1984, p.115-135) MP 183
Simeni, O.W.	570 ₁ MIP 1089	Buckling analysis of cracked, floating ice sheets [1984, 28p.] SR 84-2
Construction and performance of the Hess creek earth fill dam, Livengood, Alaska [1973, p.23-34] MP 859	Repetitive loading tests on membrane enveloped road sec- tions during freeze-thaw cycles [1978, p.1277-1288]	Ice forces on rigid, vertical, cylindrical structures (1984, 36p.)
Survey of road construction and maintenance problems in	MCP 1158	36p. ₁ CR 84-3 Determining the characteristic length of floating ice sheets b
central Aleska (1976, 36p.) SR 76-08 Slaughter, C.W.	Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] CR 79-66	moving loads [1985, p.155-159] MP 185
Spread of cetyl-1-C14 alcohol on a melting anow surface	Construction and performance of membrane encapsulated soil layers in Alaska (1979, 27p.) CR 79-16	Arctic ice and drilling structures (1985, p.63-69) MP 211
[1966, p.5-8] MP 876 FIRE IN THE NORTHERN ENVIRONMENT-A SYM-	Insulating and load-supporting properties of sulfur form for	Sheet ice forces on a conical structure: an experimental stud [1985, p.46-54] MP 191
POSIUM (1971, 275p.) MP 878	expedient roads in cold regions [1979, 21p.]	Sheet ice forces on a conical structure: an experimental stud
Arctic and Subarctic environmental analyses utilizing ERTS- 1 imagery; bimonthly progress report, 23 June - 23 Aug.	High-explosive cratering in frozen and unfrozen soils in Alas-	[1985, p.643-655] MP 190
1972 (1972, 3p.) MP 991	ks [1980, 21p.] CR 80-69 Testing shaped charges in unfrozen and frozen silt in Alaska	Characteristic frequency of force variations in continuous crushing of sheet ice against rigid cylindrical structure
Arctic and subarctic environmental analysis [1972, p.28- 30] MIP 1119	[1982, 10p.] SR 82-02	[1986, p.1-12] MP 201 Impact ice force and pressure: An experimental study wit
Seasonal regime and hydrological significance of stream ic- ings in central Alaska 1973, p.528-540; MP 1026	Smith, S.J. Observations of pack ice properties in the Weddell Sea	urea ice [1986, p.569-576] MIP 203
ings in central Alaska [1973, p.528-540] MP 1926 Arctic and subarctic environmental analyses utilizing ERTS-	(1982, p.105-106) MP 1666 Reports of the U.SU.S.S.R. Weddell Polynya Expedition,	Some effects of friction on ice forces against vertical structures (1986, p.528-533) MP 203
1 imagery [1973, 5p.] MP 1611	October-November 1981, Volume 5, Sea ice observations	Plexural and buckling failure of floating ice sheets against
Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Bimouthly progress report, 23 Aug 23 Oct.	(1983, 6p. + 59p. ₁ SR 83-2 Comparison of winter climatic data for three New Hampahire	structures [1986, p.339-359] MP 213 Practure toughness of model ice [1986, p.365-376]
1973 [1973, 3p.] MP 1030 Arctic and subarctic environmental analyses utilizing ERTS-	sites [1986, 78p.] SR 86-05	MP 212
1 imagery. Bimonthly progress report, 23 Oct 23 Dec.	Smelling, M.A. Comparison of three compactors used in pothole repair	Sommerfeld, R.A. Comments on "Theory of metamorphism of dry snow" b
1973 (1973, 6p.) MP 1931 Arctic and subarctic environmental analysis utilizing ERTS-	[1984, 14p.] SR 84-31	S.C. Colbeck (1984, p.4963-4965) MP 180
1 imagery. Final report June 1972-Feb. 1974, 128p.; MP 1047	Snow Symposium, 1st, Hanover, NH, August 1981 {Proceetings; (1982, 324p.) SR 82-17	Sceng, T.T. Dynamic ice-structure interaction analysis for narrow vertice
Snow accumulation for arctic freshwater supplies [1975,	Snow Symposium, 2nd, Hanover, NH, August 1982	structures [1981, p.472-479] MP 145
p.218-2241 MP 866 High-latitude basins as settings for circumpolar environmen-	Snow Symposium 2; U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, Au-	Spaine, P.A. Land treatment module of the CAPDET program [1977,
tal studies [1975, p.IV/57-IV/68] MP 917	gust 1982, Vol.1 [1983, 295p.] SR 83-84	4p. ₃ MP 111
Site access for a subarctic research effort [1976, 13p.] CR 76-09	Snow Symposium, 3rd, Hanover, NH, Aug. 9-16, 1983 Proceedings, Vol.1 [1983, 241p.] SR 83-31	Computer procedure for comparison of land treatment an conventional treatment: preliminary designs, cost analysi
Vehicle for the future [1976, p.272-279] MIP 1384	Snow Symposium, 4th, Henover, NH, Aug. 14-16, 1964	and effluent quality predictions [1978, p.335-340] MP 115
Fate and effects of crude oil spilled on permafrost terrain. First year progress report [1976, 18p.] SR 76-15	Proceedings, Vol.1 [1984, 433p.] SR 84-35 Sodhi, D.S.	Sparrow, E.B.
Kolyma water balance station, Magadan Oblast, northeast	Ice arching and the drift of pack ice through restricted chan- nels [1977, 11p.] CR 77-18	Fate and effects of crude oil spilled on permafrost terrain First year progress report [1976, 18p.] SR 76-1
U.S.S.R.: United States-Soviet scientific exchange visit [1977, 66p.] SR 77-15	Finite element formulation of a sea ice drift model (1977,	Fate and effects of crude oil spilled on permafrost terrain
Subarctic watershed research in the Soviet Union [1978, p.305-313] MP 1273	p.67-76 ₁ MP 1165 Ice arching and the drift of pack ice through channels (1978,	Second annual progress report, June 1976 to July 197 [1977, 46p.] SE 77-4
Landsat data collection platform at Devil Canyon site, upper	p.415-432 ₁ MP 1138	Fate and effects of crude oil spilled on subarctic permafror terrain in interior Alaska [1980, 128p.] MP 131
Susitna Basin, Alaska—Performance and analysis of data [1979, 17 refs.] SR 79-02	Ice pile-up and ride-up on Arctic and subarctic beaches [1979, p.127-146] MP 1230	Fate and effects of crude oil spilled on subarctic permafron
Sediment load and channel characteristics in subarctic upland catchments [1981, p.39-48] MP 1518	Buckling analysis of wedge-shaped floating ice sheets [1979, p.797-810] MP 1232	terrain in interior Alaska (1980, 67p.) CR 80-2 St. Lewrence, W.F.
Hydrology and climatology of the Caribou-Poker Creeks Re-	Shore ice pile-up and ride-up: field observations, models,	Acoustic emissions in the investigation of avalanches [1977, p.VII/24-VII/33] MP 163
search Watershed, Alasks [1982, 34p.] CR 82-26 Constraints and approaches in high latitude natural resource	theoretical analyses (1980, p.209-298) MP 1295 Review of buckling analyses of ice sheets (1980, p.131-146)	p.VII/24-VII/33 ₁ MIP 163 Creep rupture at depth in a cold ice sheet [1978, p.733 ₁
sampling and research [1984, p.41-46] MP 2013	MP 1322 Nonsteady ice drift in the Strait of Belle Isle [1980, p.177-	MP 116
Sletten, R.S. Wastewater renovation by a prototype slow infiltration land	186 ₁ MP 1364	Hydraulic transients: a seismic source in voicances and glaciers [1979, p.654-656] MP 118
treatment system [1976, 44p.] CR 76-19	Sea ice piling at Fairway Rock, Bering Strait, Alaska: observa- tions and theoretical analysis [1981, p.985-1000]	Phenomenological description of the acoustic emission re sponse in several polycrystalline materials [1979, p.223-
Feasibility study of land treatment of wastewater at a subarctic Alaskan location [1976, 21p.] MP 868	MP 1460	228 ₁ MP 124
Wastewater treatment in cold regions [1976, 15p.] MP 965	Ice pile-up and ride-up on arctic and subarctic beaches [1981, p.247-273] MP 1538	Acoustic emission response of snow (1980, p.209-216) MP 136
Overview of land treatment from case studies of existing sys-	Port Huron ice control model studies [1982, p.361-373] MP 1530	Comparison of thermal observations of Mount St. Helen
tems [1976, 26p.] MP 591 Feasibility study of land treatment of wastewater at a subarc-	Model study of Port Huron ice control structure; wind stress	before and during the first week of the initial 1980 eruption [1980, p.1526-1527] MP 148
tic Alaskan location [1977, p.533-547] MP 1268	simulation (1982, 27p.) CR 82-69 Bering Strait see ice and the Fairway Rock icefoot (1982,	Constitutive relation for the deformation of snow [1981, p.3-14] MP 137
Wastewater treatment alternative needed [1977, p.82-87] MP 968	40p. ₃ CR 82-31	Investigation of the acoustic emission and deformation re
Land application of wastewater in permafrost areas (1978, p.911-917) MP 1110	Determining the characteristic length of model ice sheets [1982, p.99-104] MP 1870	sponse of finite ice plates [1981, 19p.] CR 81-0 Investigation of the acoustic emission and deformation re
Energy and costs for agricultural reuse of wastewater [1980,	Hydraulic model study of Port Huron ice control structure [1982, 59p.] CR 82-34	sponse of finite ice plates [1981, p.123-133]
p.339-346j MP 1401 Lime stabilization and land disposal of cold region wastewater	Experimental determination of the buckling loads of floating	MP 143 On the acoustic emission and deformation response of finit
	ice sheets [1983, p.260-265] MP 1626 Experiments on ice ride-up and pile-up [1983, p.266-270]	ice plates (1981, p.385-394) MP 145
lagoon sludge [1982, p.207-213] MP 1696 Direct filtration of streamborne glacial silt [1982, 17p.] CR 82-23	MP 1627	Preliminary investigation of the acoustic emission and deformation response of finite ice plates [1982, p.129-139]
Accumulation, characterization, and stabilization of sludges	Dynamic buckling of floating ice sheets [1983, p.822-833] MP 1607	MP 158 Acoustic emissions from polycrystalline ice [1982, p.183-
for cold regions lagoons [1984, 40p.] SR 84-08 Smith, D.W.	Ice forces on model marine structures (1983, p.778-787) MP 1606	199 ₁ MIP 152
Cold climate utilities delivery design manual [1979, c300 leaves] MP 1373	Measurement of ice forces on structures (1983, p.139-155)	Acoustic emissions from polycrystalline ice [1982, 15p.] CR 82-2
Rapid detection of water sources in cold regions—a selected	MP 1641 Ice action on two cylindrical structures [1983, p.159-166]	CR 82-2 Fluid dynamic analysis of volcanic tremor [1982, 12p.] CR 82-3
bibliography of potential techniques [1979, 75p.] SR 79-10	MP 1443 Ice forces on model bridge piers (1983, 11p.) CR 83-19	Source mechanism of volcanic tremor [1982, p.8675-8683]
Cold climate utilities manual [1986, var.p.] MP 2135	Ice action on pairs of cylindrical and conical structures	MP 157 Study on the tensile strength of ice as a function of grain siz
Smith, G.A. Rapid detection of water sources in cold regions—a selected	[1983, 35p.] CR 83-25 Ice force measurements on a bridge pier in the Ottauquechee	(1983, 38p.) CR 63-1
bibliography of potential techniques [1979, 75p.] SR 79-10	River, Vermont [1983, 6p.] CR 83-32	Observations of volcanic tremor at Mount St. Helens volcan [1984, p.3476-3484] MP 177
Smith, N.	Experimental determination of buckling loads of cracked ice sheets [1984, p.183-186] MP 1687	Stallion, M.
Use of explosives in removing ice jams (1970, 10p.) MP 1021	lce action on two cylindrical structures (1984, p.107-112) MP 1741	Debris of the Chena River [1976, 14p.] CR 76-2 Stallman, P.E.
Analysis of flexible pevement resilient surface deformations	Dependence of crushing specific energy on the aspect ratio	Improved millivolt-temperature conversion tables for coppe
using the Chevron layered clastic analysis computer program [1975, 13 leaves] MP 1264	and the structure velocity [1984, p.363-374] MP 1700	constantan thermocouples. 32F reference temperatur [1976, 66p.] SR 76-1
Observations along the pipeline haul road between Livengood and the Yukon River [1976, 73p.] SR 76-11	Computational mechanics in arctic engineering [1984, p.351-374] MP 2072	Abnormal internal friction peaks in single-crystal ice [1977, 15p.] SR 77-2

Stambach, G.	Appearant anomaly in fraction of codinary water .1076	Design and model testing of a river ice prow [1986, p.137-
Results of the US contribution to the Joint US/USSR Bering	Apparent anomaly in freezing of ordinary water [1976, 23p.] CR 76-29	150 ₁ MP 2132
Sea Experiment [1974, 197p.] MP 1032	Projectile and fragment penetration into ordinary snow	Taylor, R.A.
Stanley, L.E. Utilization of sewage sludge for terrain stabilization in cold	(1977, 30p.) MIP 1756 Snow and snow cover in military science (1978, p.1-239-1-	Effects of winter military operations on cold regions terrain [1978, 34p.] SR 78-17
regions [1977, 45p.] SR 77-37	262 ₁ MP 926	Technology transfer opportunities for the construction
Utilization of sewage sludge for terrain stabilization in cold	Alaska Good Friday earthquake of 1964 [1982, 26p.]	engineering community: materials and diagnostics Technology transfer opportunities for the construction engi-
regions, Part 2 [1979, 36p.] SR 79-28 Stanton, T.K.	Syers, J.E.	neering community: materials and diagnostics (1986,
Laboratory studies of acoustic scattering from the underside	Effectiveness of land application for phosphorus removal	54p-1 SR 86-01
of sea ice [1985, p.87-91] MP 1912	from municipal waste water at Manteca, California (1980, p.616-621) MP 1444	Tedrew, J.C.F. Pedologic investigations in northern Alaska (1973, p.93-
Stark, K.L. Effects of inundation on six varieties of turigrass [1982,	Evaluation of a simple model for predicting phosphorus re-	108 ₁ MP 1005
25p. _] SR 82-12	moval by soils during land treatment of wastewater [1982, 12p.] SR 82-14	Templeton, M.E.
Standler, B.	Symposium on Applied Glacielogy, 2nd, West Lebence,	Numerical simulation of atmospheric ice accretion (1979, p.44-52) MP 1235
C-14 and other isotope studies on natural ice (1972, p.D70- D92) MP 1652	N.H., Ang. 23-27, 1982 Proceedings (1983, 314p.) MP 2854	Computer modeling of atmospheric ice accretion [1979,
Stophens, C.A.	Proceedings [1983, 314p.] MP 2854 Tagachi, S.	36; CR 79-04 Thomas, R.E.
Break-up dates for the Yukon River; Pt.1. Rampart to White- horse, 1896-1978 (1979, c50 leaves) MP 1317	Primary productivity in sea ice of the Weddell region (1978,	Cost of land treatment systems [1979, 135p.] MP 1387
Break-up dates for the Yukon River; Pt.2. Alakanuk to Tana-	17p. ₁ CR 78-19 Sea ice and ice algae relationships in the Weddell Sea [1978,	EPA policy on land treatment and the Clean Water Act of
na, 1883-1978 [1979, c50 leaves] MP 1318	p.70-71 ₃ MIP 1203	1977 [1980, p.452-460] MP 1418 Thomas, R.H.
Break-up of the Yukon River at the Haul Road Bridge: 1979 [1979, 22p. + Figs.] MP 1315	Standing crop of algae in the sea ice of the Weddell Sea region [1979, p.269-281] MP 1242	Rheology of glacier ice [1985, p.1335-1337] MP 1844
Stophens, J.B.	Takagi, S.	Thompson, T.W.
Mars soil-water analyzer: instrument description and status [1977, p.149-158] MP 912	Segregation-freezing temperature as the cause of suction force	Progress report on 25 cm radar observations of the 1971 AID- JEX studies [1972, p.1-16] MP 989
Sterrett, E.F.	[1977, p.59-66] MP 901 Segregation freezing as the cause of suction force for ice ions	Theradike, A.S.
Arctic environment and the Arctic surface effect vehicle	formation [1978, p.45-51] MIP 1081	Snow and ice [1975, p.435-441, 475-487] MP 844
[1976, 28p.] CR 76-01 Applications of thermal analysis to cold regions [1976,	Viscoelastic deflection of an infinite floating ice plate subjected to a circular load [1978, 32p.] CR 78-65	Tics, A. Mobility of water in frozen soils (1982, c15p.)
p.167-181 ₃ MP 896	Segregation freezing as the cause of suction force for ice lens	MCP 2012
Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412]	formation [1978, 13p.] CR 78-86	Tics, A.R.
MP 1412	In-plane deformation of non-coaxial plastic soil [1978, 28p.] CR 78-67	Prediction of unfrozen water contents in frozen soils from liquid determinations [1976, 9p.] CR 76-08
Stevens, H.W.	Buckling pressure of an elastic plate floating on water and	Simple procedure to calculate the volume of water remaining
Subsurface explorations in permafrost areas (1959, p.31-41) MP 885	stressed uniformly along the periphery of an internal hole [1978, 49p.] CR 78-14	unfrozen in a freezing soil (1976, p.114-122) MP 899
Design of foundations in areas of significant frost penetration	Fundamentals of ice lens formation [1978, p.235-242]	Mars soil-water analyzer: instrument description and status [1977, p.149-158] MP 912
[1980, p.118-184] MP 1358	MP 1173	Determination of unfrozen water in frozen soil by pulsed
Stewart, D.M. Physical measurement of ice jams 1976-77 field season	Steady in-plane deformation of noncoaxial plastic soil [1979, p.1049-1072] MP 1248	nuclear magnetic resonance [1978, p.149-155] MP 1097
[1978, 19p.] SR 78-03	Some Bessel function identities arising in ice mechanics prob-	Water vapor adsorption by sodium montmorillonite at -5C
Entrainment of ice floes into a submerged outlet [1978,	lems [1979, 13p.] CR 79-27 Adsorption force theory of frost heaving [1980, p.57-81]	(1978, p.638-644) MP 981
p.291-299 ₁ MIP 1137 Force distribution in a fragmented ice cover [1982, p.374-	MP 1334	Phase composition measurements on soils at very high water contents by pulsed nuclear magnetic resonance technique
387 ₃ MP 1531	Summary of the adsorption force theory of frost heaving	[1978, p.11-14] MP 1210
Force distribution in a fragmented ice cover [1984, 16p.] CR 84-07	[1980, p.233-236] MIP 1332 Initial stage of the formation of soil-laden ice lenses [1982,	Viking GCMS analysis of water in the Martian regolith [1978, p.55-61] MP 1195
Stewart, G.L.	p.223-232 ₁ MP 1596	Analysis of water in the Martian regolith (1979, p.33-38)
Treatment of primary sewage effluent by rapid infiltration	Stefan's problem in a finite domain with constant boundary and initial conditions; analysis (1985, 280.) SR 25-68	MP 1409
(1976, 15p.) CR 76-49	Stefan's problem in a finite domain with constant boundary and initial conditions: analysis [1985, 28p.] SR 85-98 Tauji, E.K.	MP 1409 Low temperature phase changes in montmorillonite and non-
	and initial conditions: analysis (1985, 28p.) Tanti, K.X. Soil microbiology (1981, p.38-44) MP 1753	MP 1409
(1976, 15p.) CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts (1976, 34p.) CR 76-48 Stokely, J.L.	and initial conditions: analysis [1985, 28p.] SR 85-68 Tanji, E.K. Soil microbiology [1981, p.38-44] MP 1753 Evaluation of a compartmental model for prediction of ni-	MP 1469 Low temperature phase changes in montmorillouite and non-troute at high water contents and high salt contents [1980, p. 139-144] MP 1338 Unfrozen water contents of submarine permafrost determined
(1976, 15p.) CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts (1976, 34p.) CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the	and initial conditions: analysis [1985, 28p.] SR 85-68 Tanfi, E.X. Soil microbiology [1981, p.38-44; MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils	Low temperature phase changes in montmorillouite and non- trouite at high water contents and high salt contents (1980, p.139-144) MP 1330
(1976, 15p.) CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts (1976, 34p.) CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont (1980, 241p.) MP 1471	and initial conditions: analysis [1985, 28p.] SR 85-68 Tanji, E.K. Soil microbiology [1981, p.38-44] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] CR 81-23 Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851	MP 1409 Low temperature phase changes in montmorillouite and non- tronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in
(1976, 15p.) CR 76-49 Rapid infiliration of primary sewage effluent at Fort Devena, Massachusetts (1976, 34p.) CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Ver- mont (1980, 241p.) MP 1471 Stelssenbach, K.D.	and initial conditions: analysis [1985, 28p.] SR 85-68 Tanji, E.K. Soli microbiology [1981, p.38-44] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] CR 81-23 Mathematical simulation of nitrogen interactions in solts [1983, p.241-248] MP 2851 Tankin, R.S.	MP 1409 Low temperature phase changes in montmorillouite and non- tronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrest determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic reso- nance and physical desorption data [1982, 85.]
(1976, 15p.) CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts (1976, 34p.) CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Ver- mont (1980, 241p.) MP 1471	and initial conditions: analysis [1985, 28p.] SR 85-68 Tanji, E.K. Soil microbiology [1981, p.38-44] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] CR 81-23 Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankin, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366]	MP 1409 Low temperature phase changes in montmorillouite and non- tronite at high water contents and high salt contents [1980, p.139-144] MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic reso- nance and physical desorption data [1982, 8p.] CR 82-15
(1976, 15p.) CR 76-49 Rapid infiliration of primary sewage effluent at Fort Devena, Massachusetts (1976, 34p.) CR 76-48 Stokely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont (1980, 241p.) MP 1471 Steinenbach, K.D. Dynamics of frazil ice formation (1984, p.161-172) MP 1829 Sterm, P.C.	and initial conditions: analysis [1985, 28p.] SR 85-68 Tanfi, E.X. Soil microbiology [1981, p.38-44] Evaluation of a compartental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Tankia, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366) MP 1160	MP 1449 Low temperature phase changes in montmorillonite and non-tronite at high water contents and high salt contents [1980, p.139-144] MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Ver- mont [1980, 241p.] MP 1471 Stekesbach, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana.	and initial conditions: analysis [1985, 28p.] SR 25-08 Tanji, E.X. Soil microbiology [1981, p.38-44] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] CR 81-23 Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankin, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366) MP 1160 Tankillo, T.J. Hydraulic model study of a water intake under frazil ice con-	MP 1409 Low temperature phase changes in montmorillouite and non- tronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic reso- nance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] Method for measuring enriched levels of deuterium in soil
(1976, 15p.) CR 76-49 Rapid infiliration of primary sewage effluent at Fort Devena, Massachusetts (1976, 34p.) CR 76-48 Stokely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont (1980, 241p.) MP 1471 Steinenbach, K.D. Dynamics of frazil ice formation (1984, p.161-172) MP 1829 Sterm, P.C.	and initial conditions: analysis [1985, 28p.] SR 85-68 Tanfi, E.K. Soil microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 160 Tankillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03	MP 1409 Low temperature phase changes in montmorillonite and non- tronite at high water contents and high salt contents [1980, p.139-144] MP 1339 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic reso- nance and physical desorption data [1982, 8p.] Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1594 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] SR 82-25
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Ver- mont [1980, 241p.] MP 1471 Stekesbach, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H.	and initial conditions: analysis [1985, 28p.] SR 85-08 Tanfi, E.X. Soli microbiology [1981, p.38-44] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in solis [1983, p.241-248] MP 2651 Tankin, B.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tankille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tathacteur, J.C.	MP 1409 Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determi-
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Ver- mont [1980, 241p.] MP 1471 Stekesback, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems	and initial conditions: analysis [1985, 28p.] SR 85-68 Tanfi, E.K. Soil microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankin, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1760 Tankillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tathaclaux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] MP 1860	MP 1409 Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozon water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1594 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226]
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Ver- mont [1980, 241p.] MP 1471 Stelseshech, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koccanusa, Mostana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] Strahler, A.H. Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535, 550) MP 1695	and initial conditions: analysis [1985, 28p.] Tanfi, E.X. Soil microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankin, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366) MP 1160 Tankille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tathacksux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] MP 1860 Laboratory investigation of the mechanics and hydraulics of	MP 1409 Low temperature phase changes in montmorillouite and non- tronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1318 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions MP 1629 Transport of water in frozen soil. 2. Effects of ice on the
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelueshach, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1695 Stabetad, J.	and initial conditions: analysis [1985, 28p.] SR 25-08 Tanji, E.X. Soli microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] MP 2851 Tankia, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] Tatincleux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice covery—	MP 1409 Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozon water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by particular to the property of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.211-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] MP 1629
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Ver- mont [1980, 241p.] MP 1471 Stelneshach, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] Strahler, A.H. Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550) MP 1695 Stahletad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962	and initial conditions: analysis [1985, 28p.] Tanfi, E.X. Soil microbiology [1981, p.38-44] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MMP 2851 Tankia, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366) MP 1160 Tankille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] Tathacksux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Cm 77-69 Compressive and shear strengths of fragmented ice covers a laboratory study [1977, 42p.] MP 951	MP 1409 Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions (1983, p.5-26) Relationship between the ice and unfrozen water places in
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelmenhech, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SK 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550) MP 1695 Stabstad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962 Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962	and initial conditions: analysis [1985, 28p.] SR 25-08 Tanji, E.X. Soli microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] MP 2851 Tankia, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] Tatincleux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice covery—	Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1318 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekely, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Ver- mont [1980, 241p.] MP 1471 Stelneshach, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] Strahler, A.H. Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550) MP 1695 Stahletad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.K. Soli microbiology [1981, p.38-44] By 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] MR 123 Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MRP 2851 Tankin, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MRP 1160 Tastincleux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97b.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97b.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice coveral absoratory study [1977, 52p.] MRP 951 Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] In-situ measurements of the mechanical properties of ice	MP 1409 Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] MP 1330 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] Mr 1982, p.115-121 Mr 1982, 12p.1 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions (1982, p.221-26) Relationship between the ice and unfrozen water pis in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MR 1632 Effect of unconfined loading on the unfrozen water content
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelnesheeh, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] Strahend, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] Repetitive loading tests on membrane enveloped road sections during freeze-thaw cycles [1978, p.1277-1288] MP 1158 Nondestructive testing of in-service highway pavements in	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.K. Soil microbiology [1981, p.38-44; MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] Tatincleux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Campressive and shear strengths of fragmented ice covers a laboratory study [1977, 82p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] In-situ measurements of the mechanical properties of ice [1982, p.326-334] MP 1558	Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1318 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Missachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stehsenbach, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] Strahsted, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962 Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-125] MP 1138 Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] CR 79-06	and initial conditions: analysis [1985, 28p.] SR 85-08 Tanfi, E.X. Soil microbiology [1981, p.38-44] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tastinchers, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] MP 1660 Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] CR 70-9 Compressive and absers strengths of fragmented ice covernal laboratory study [1977, 82p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47]	Low temperature phase changes in montmorillouite and non- tronite at high water contents and high salt contents [1980, p.139-144] MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic reso- nance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1594 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determi- nation of soil-water diffusivity under isothermal conditions (1982, p.221-226) Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions (1983, p.15-26) MP 16601 Relationship between the ice and unfrozen water pi—s in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Effect of unconfined loading on the unfrozen water content of Manchester silt [1983, 17p.] Soil-water diffusivity of unsaturated frozen soils at subzerot temperatures (1983, p.889-893) MP 1664
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelnesheeh, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] Strahend, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] Repetitive loading tests on membrane enveloped road sections during freeze-thaw cycles [1978, p.1277-1288] MP 1158 Nondestructive testing of in-service highway pavements in	and initial conditions: analysis [1985, 28p.] SR 25-08 Tanfi, E.X. Soli microbiology [1981, p.38-44; MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in solis [1983, p.241-248] MP 2851 Tankia, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1760 Tastillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 21-03 Tatinclears, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice covers—a laboratory study [1977, 52p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] MP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] MP 1555 Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47]	Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozon water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by Date of MP 1894 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.211-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1982, p.211-226] Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Refect of unconfined loading on the unfrozen water content of Manchester sitt [1983, 17p.] SR 83-18 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.88-893] MP 1634 Water migration due to a temperature gradient in frozen soil
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Missachusetts [1976, 34p.] CR 76-48 Stehaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stehsenbach, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Stearm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1695 Stabstad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962 Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-127] MP 962 Ropetitive loading tests on membrane enveloped road sections during freeze-thaw cycles [1978, p.1277-1285] MP 1158 Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] CR 79-06 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] SR 84-05 Stehestad, J.M.	and initial conditions: analysis [1985, 28p.] SR 85-08 Tanfi, E.K. Soil microbiology [1981, p.38-44] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] MP 2851 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 160 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tankillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tatincleux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Compressive in a strengths of fragmented ice covers a laboratory study [1977, 82p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] MP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-87] MP 1568 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] MP 1648	MP 1409 Low temperature phase changes in montmorillouite and nontronite at high water contents and high salt contents [1980, p.139-144] MP 1336 MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1594 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Effect of unconfined loading on the unfrozen water content of Manchester silt [1983, 17p.] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] MP 1664 Water migration due to a temperature gradient in frozen soil 1983, p.951-956; MP 1666 Transport of water in frozen soil. 1. Experimental determination of water in frozen soil. 1.
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stebusshech, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-50) MP 1695 Stabstad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962 Repetitive loading tests on membrane enveloped road sections during freeze thaw cycles [1978, p.1277-1285] MP 1138 Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] GP 1158 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] SR 84-65 Stebstad, J.M. Experimental scaling study of an annular flow ice-water heat	and initial conditions: analysis [1985, 28p.] Tanfi, E.X. Soil microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Tankia, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] Tatinclasz, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice covernal aboratory study [1977, 82p.] MP 1640 MP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47] MP 1568 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests on two models of WTGB 140-foot icebreaker	Low temperature phase changes in montmorillouite and non- tronite at high water contents and high salt contents [1980, p.139-144] Unfrozon water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1318 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic reso- nance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determi- nation of soil-water diffusivity under isothermal conditions [1982, p.221-226] MP 1629 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26) MP 1632 Relationship between the ice and unfrozen water pl.——s in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46) MP 1632 Biffect of unconfined loading on the unfrozen water content of Manchester sit [1983, 17p.] SR 83-18 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] Water migration due to a temperature gradient in frozen soil [1983, p.951-956] Transport of water in frozen soil. 1. Experimental determi- nation of soil-water diffusivity under isothermal conditions of soil-water diffusivity under isothermal conditions
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Missachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stekneshech, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Stearm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1695 Stabstad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962 Repetitive loading tests on membrane enveloped road sections during freeze-thaw cycles [1978, p.1277-1285] Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] CR 79-06 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] SR 84-05 Stekstad, J.M. Experimental scaling study of an annular flow ice-water heat sink [1977, 54p.] Repetitive loading tests on membrane-enveloped road sections (1977, 54p.)	and initial conditions: analysis [1985, 28p.] SR 25-06 Tanfi, E.X. Soil microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Tankin, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 160 Tastfille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] Tattaclaux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Can pressive and shear strengths of fragmented ice coveral laboratory study [1977, 45p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] MP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.374-47, MP 1568 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests on two models of WTGB 140-foot icebreaker (1984, 17p.) Ice resistance tests on two models of the WTGB icebreaker	Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozon water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.211-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water in the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Refect of unconfined loading on the unfrozen water content of Manchester sit [1983, p.37-46] MR 1640 Water migration due to a temperature gradient in frozen soil 1983, p.951-956; Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, p.951-956] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, p.951-956] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, p.951-956] Transport of water in frozen soil. 2. Experimental determination of soil-water diffusivity under isothermal conditions [1983, 8p.] Transport of water in frozen soil. 3. Experiments on the ef-
CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelneshech, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana, Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-50) Strahler, A.H. Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-197) Repetitive loading tests on membrane enveloped road sections during freeze-thaw cycles [1978, p.1277-1285] Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] Repetitive loading tests on membrane-enveloped road sections for the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, p.1277-1286] Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 166-]	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.K. Soli microbiology [1981, p.38-44] By 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Reaching loses [1981, 24p.] MR 128-23 Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Tankin, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MR 1160 Tastifile, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tatincleux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice covers a laboratory study [1977, 52p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47, MP 1558 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests on two models of WTGB 140-foot icebreaker (1984, 17p.) Ice resistance tests on two models of the WTGB icebreaker (1984, p.627-638) MP 1716	Low temperature phase changes in montmorillouite and nontronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NIMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] MP 1629 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Refect of unconfined losding on the unfrozen water content of Manchester silt [1983, 17p.] SR 83-18 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] Water migration due to a temperature gradient in frozen soil [1983, p.951-956] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, p.951-956] Transport of water in frozen soil. 3. Experiments on the effects of ice content [1984, p.28-34] MP 1841
CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stebusshech, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] Stabetad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-197) MP 962 Repetitive loading tests on membrane enveloped road sections during freeze thaw cycles [1978, p.1277-1285] MP 1138 Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] SR 84-05 Stebetad, J.M. Experimental scaling study of an annular flow ice-water heat sink [1977, 34p.] Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 78-12 Design procedures for underground heat sink systems [1979,	and initial conditions: analysis [1985, 28p.] SR 25-06 Tanfi, E.X. Soli microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankia, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 21-03 Tatinclears, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice covers—a laboratory study [1977, 52p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] MP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47] Asymmetric plane flow with application to ice jams [1983, p.1540-1556] MP 1558 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] MP 1645 Model tests on two models of WTGB 140-foot icebreaker (1984, 17p.] Ice resistance tests on two models of the WTGB icebreaker (1984, p.627-638] Medel tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, 124p.] SR 84-06 Experimental microscopic plane flow in the mechanical properties of ice breaker (1984, 17p.) Residuation of the flow with application to ice jams [1983, p.1540-1556] MP 1736 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] MP 1758	Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozon water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.211-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water in the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Refect of unconfined loading on the unfrozen water content of Manchester sit [1983, p.37-46] MR 1640 Water migration due to a temperature gradient in frozen soil 1983, p.951-956; Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, p.951-956] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, p.951-956] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, p.951-956] Transport of water in frozen soil. 2. Experimental determination of soil-water diffusivity under isothermal conditions [1983, 8p.] Transport of water in frozen soil. 3. Experiments on the ef-
CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelmeshech, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana, Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-50) Strahler, A.H. Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-197) Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-197) Nondestructive testing of in-service highway pevements in Maine [1979, 22p.] Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] SR 84-95 Stehstad, J.M. Experimental scaling study of an annular flow ice-water heat cink [1977, 54p.] Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 78-12 Design procedures for underground heat sink systems [1979, 1869, in "ut pagna.] SR 78-08	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.K. Soli microbiology [1981, p.38-44] By 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Reaching loses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastificians, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Cappeasive and shear strengths of fragmented ice covers a laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice covers a laboratory study [1977, 82p.] MP 951 Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] MP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47] MP 1568 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests on two models of WTGB 140-foot icebreaker (1984, 17p.) Ice resistance tests on two models of the WTGB icebreaker (1984, 17p.) Ice resistance tests on two models of the WTGB icebreaker (1984, 17p.) Ice resistance tests on two models of the WTGB icebreaker (1984, 17p.) Ice resistance tests on two models of the WTGB icebreaker (1984, 17p.) Ice resistance tests on two models of the WTGB icebreaker (1984, 17p.) Ice resistance tests on two models of the WTGB icebreaker (1984, 17p.)	Low temperature phase changes in montmorillouite and nontronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NIMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] MP 1629 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26) Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Effect of unconfined loading on the unfrozen water content of Manchester silt [1983, 17p.] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.89-893] Water migration due to a temperature gradient in frozen soil [1983, 8p.] Transport of water in frozen soil. 1. Experiments on the effects of iow temperatures on the growth and unfrozen water fects of iow temperatures on the growth and unfrozen water footen of loading to the unfrozen water on tent fects of iow temperatures on the growth and unfrozen water content of an aquatic plant [1984, 8p.] CR 84-14 Effects of low temperatures on the growth and unfrozen water content of the unfrozen water content of the unfrozen water content of the
cR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelnesbach, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] Stabstad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962 Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-197, p. 177-1285) MP 1138 Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] SR 84-95 Stebstad, J.M. Experimental scaling study of an annular flow ice-water heat sink [1977, 54p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 78-12 Design procedures for underground heat sink systems [1979, 186p. in -vr. pagna.] SR 2018van, C.W.	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.X. Soil microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 160 Tastille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] Tatincleux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Compressive and shear strengths of fragmented ice coveralsoratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] MP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47] MP 1563 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638]	Low temperature phase changes in montmorillouite and nontronite at high water contents and high salt contents [1980, p.139-144] MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] Method for measuring enriched levels of deuterium in soil water (1982, 12p.) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.221-226) Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions (1982, p.221-226) MP 1629 Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions (1983, p.15-26) Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data (1983, p.37-46) MP 1632 Effect of unconfined loading on the unfrozen water content of Manchester silt (1983, 17p.) SR 83-18 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures (1983, p.889-893) MP 1664 Water migration due to a temperature gradient in frozen soil (1983, 8p.) CR 83-22 Transport of water in frozen soil: 3. Experiments on the effects of ice content (1984, p.28-34) MP 1841 Effects of soluble salts on the unfrozen water contents of the Lanzbou, P.R.C., silt (1984, 18p.) CR 84-16
CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelmeshech, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550) SR 82-23 Strahler, A.H. Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-197) Repetitive loading tests on membrane enveloped road sections during freeze-thaw cycles [1978, p.1277-1288] MP 1158 Nondestructive testing of in-service highway pevements in Maine [1979, 22p.] Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] Stehstad, J.M. Experimental scaling study of an annular flow ice-water heat eink [1977, 54p.] Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 78-12 Design procedures for underground heat sink systems [1979, 1809, in "u. pagna.] SR 79-08 Sullivan, C.W. Sea ice microbial communities in Antarctica [1986, p.243-250) MP 2026	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.K. Soli microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] MR 1783 Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MRP 2851 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MRP 1160 Tastille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tathaclaux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Compressive and shear strengths of fragmented ice covernal boratory study [1977, 82p.] MRP 1960 Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice covernal boratory study [1977, 82p.] MRP 1951 Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] MRP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47] MRP 1565 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests on two models of WTGB 140-foot icebreaker (1984, 17p.] Ice resistance tests on two models of the WTGB icebreaker (1984, 24p.) Laboratory investigation of the kinetic friction coefficient of ice [1984, p.19-28] Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker [1985, 13p.] CR 83-64	Low temperature phase changes in montmorillouite and nontronite at high water contents and high salt contents [1980, p.139-144] MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NIMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.74-6] MP 1632 Effect of unconfined loading on the unfrozen water content of Manchester silt [1983, 17p.] SR 83-18 Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] MP 1666 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, 8p.] Transport of water in frozen soil. 2. Experimental determination of soil-water diffusivity under isothermal conditions [1983, 8p.] Transport of water in frozen soil. 3. Experiments on the effects of ice on temperatures on the growth and unfrozen water content of on aquatic plant [1984, 8p.] CR 83-22 Transport of water in frozen soil: 3. Experiments on the effects of ice of soluble selts on the unfrozen water content of the Lanzhou, P.R.C., silt [1984, 18p.] CR 84-16 Transport of water in frozen soil: 4. Analysis of experimental results on the effects of ice content [1984, p.58-69]
(1976, 15p.) Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.) Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.) MP 1471 Stelaesheck, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.) Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] Strahler, A.H. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962 Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-1285) Nondestructive testing of in-service highway pevements in Maine [1979, 22p.] Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] Stehestad, J.M. Experimental scaling study of an annular flow ice-water heat sink [1977, 34p.] Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 79-06 Stehestad, J.M. Experimental scaling study of an annular flow ice-water heat sink [1977, 34p.] Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 78-12 Design procedures for underground heat sink systems [1979, 180p. in "x. pagna.] SR 79-06 Sullivan, J.M., Jr.	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.X. Soil microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tankille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] Tathaclaux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Campressive and shear strengths of fragmented ice covernal aboratory study [1977, 82p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47] MP 1568 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class ice-breaker [1984, p.627-638]	Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozon water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by Date (1982, 1982, p.115-121) MP 1894 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.211-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1982, p.211-226] Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Effect of unconfined looding on the unfrozen water content of Manchester silt [1983, 17p.] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] MP 1664 Water migration due to a temperature gradient in frozen soil [1983, p.951-956] Transport of water in frozen soil: 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, p.951-956] Transport of water in frozen soil: 3. Experiments on the effects of ice content [1984, p.28-34] MP 1841 Effects of low temperatures on the growth and unfrozen water content of an aquatic plant [1984, 8p.] CR 84-16 Transport of water in frozen soil: 4. Analysis of experimental results on the effects of ice content of the content of the content of experimental results on the effects of ice content of the content of the content of the content of the content of water in frozen soil: 4. Analysis of experimental results on the effects of ice content of content of the content of the content of the content of t
CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Missachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelnesback, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.El. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550) Stabstad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-197, MP 962 Repetitive loading tests on membrane enveloped road sections during freeze-thaw (1977, p.171-198) MP 1158 Nondestructive testing of in-service highway pavements in Maine (1979, 22p.) Operation of the U.S. Combat Support Boat (USCSBMK) 1) on an ice-covered waterway (1984, 28p.) SR 84-68 Stabstad, J.M. Experimental scaling study of an annular flow ice-water heat eink (1977, 34p.) CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles (1978, 16p.) CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles (1978, 16p.) CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles (1978, 16p.) CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles (1978, 16p.) CR 78-12 Design procedures for underground heat sink systems (1979, 38p.) R 79-08 Sullivan, C.W. Sea ice microbial communities in Antarctics (1986, p.243-250) Sullivan, J.M., Jr. Pinite element simulation of ice crystal growth in subcooled solutions (1985, p.527-532)	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.K. Soli microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] MR 1783 Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MRP 2851 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MRP 1160 Tastille, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tathaclaux, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Compressive and shear strengths of fragmented ice covernal boratory study [1977, 82p.] MRP 1960 Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice covernal boratory study [1977, 82p.] MRP 1951 Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] MRP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47] MRP 1565 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests on two models of WTGB 140-foot icebreaker (1984, 17p.] Ice resistance tests on two models of the WTGB icebreaker (1984, 24p.) Laboratory investigation of the kinetic friction coefficient of ice [1984, p.19-28] Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker [1985, 13p.] CR 83-64	Low temperature phase changes in montmorillouite and non-tronite at high water contents and high salt contents [1980, p.139-144] Unfrozon water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1982, p.211-226) Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions (1983, p.15-26) Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Effect of unconfined loading on the unfrozen water content of Manchester silt [1983, p.37-46] Water migration due to a temperature gradient in frozen soil at subzero temperatures [1983, p.89-893] MP 1644 Water migration due to a temperature gradient in frozen soil (1983, p.951-956) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions (1983, p.951-956) Transport of water in frozen soil: 3. Experiments on the effects of ice content [1984, p.28-34] MP 1841 Effects of soluble salts on the growth and unfrozen water content of an aquatic plant [1984, 8p.] CR 84-14 Effects of soluble salts on the unfrozen water contents of the Lanzbou, P.R.C., silt [1984, 18p.] CR 84-16 Effects of magnetic particles on the unfrozen water content of frozen soils determined by nuclear magnetic resonance
Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stebusehach, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] Stahetad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw [1977, p.171-197] MP 962 Repetitive loading tests on membrane enveloped road sections during freeze-thaw cycles [1978, p.1277-1288] MP 1138 Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] SR 84-05 Stehetad, J.M. Experimental scaling study of an annular flow ice-water heat sink [1977, 34p.] Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-13 Design procedures for underground heat sink systems [1979, 186p. in "u. pagna.] SR 79-06 Sullivan, J.M., Jr. Finite element simulation of ice crystal growth in subcooled sodium-chloride solutions [1985, p.527-532] MP 2100	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.X. Soli microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Tankin, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tattaclanz, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice coveral laboratory study [1977, 45p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantillever-beam tests [1982, p.37-47] MP 1558 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests on two models of WTGB 140-foot icebreaker (1984, 17p.) Loe resistance tests on two models of the WTGB icebreaker (1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class icebreaker (1984, p.627-638) Model tests in ice of a Canadian Coast Guard R-class icebreaker (1984, p.627-638) MP 1825 Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker (1984, p.627-638) Kinetic friction coefficient of ice [1985, 40p.] Research of the kinetic friction coefficient of sea ice-1985, 20p.] Level ice breaking by a simple wedge [1985, 46p.]	Low temperature phase changes in montmorillouite and nontronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1318 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] MP 1995 MP 1996 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.211-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632 Effect of unconfined loading on the unfrozen water content of Manchester sit [1983, 17p.] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.859-893] MP 1649 Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, p.951-956] Transport of water in frozen soil. 3. Experiments on the effects of ice content [1984, p.28-34] Effects of low temperatures on the growth and unfrozen water content of the Lanzhou, P.R.C., silt [1984, 18p.] CR 84-16 Harmsport of water in frozen soil: 4. Analysis of experimental results on the effects of ice content [1984, p.3-66] MP 1843 Effects of magnetic particles on the unfrozen water content of frozen soils determined by nuclear magnetic resonance [1984, p.63-73] MP 1840
CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Missachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stelnesback, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana. Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.El. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550) Stabstad, J. Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-197, MP 962 Repetitive loading tests on membrane enveloped road sections during freeze-thaw (1977, p.171-198) MP 1158 Nondestructive testing of in-service highway pavements in Maine (1979, 22p.) Operation of the U.S. Combat Support Boat (USCSBMK) 1) on an ice-covered waterway (1984, 28p.) SR 84-68 Stabstad, J.M. Experimental scaling study of an annular flow ice-water heat eink (1977, 34p.) CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles (1978, 16p.) CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles (1978, 16p.) CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles (1978, 16p.) CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles (1978, 16p.) CR 78-12 Design procedures for underground heat sink systems (1979, 38p.) R 79-08 Sullivan, C.W. Sea ice microbial communities in Antarctics (1986, p.243-250) Sullivan, J.M., Jr. Pinite element simulation of ice crystal growth in subcooled solutions (1985, p.527-532)	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.X. Soli microbiology [1981, p.38-44] By 1753 Evaluation of a compartmental model for prediction of nitrate leaching loses [1981, 24p.] Reaching loses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] MP 2851 Tankin, E.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastificians, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Capture ice jams [1976, 97p.] Capture ice jams [1977, 45p.] Capture ice jams [1977, 45p.] MP 951 Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] MP 1733 In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantilever-beam tests [1982, p.37-47] MP 1568 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests on two models of WTGB 140-foot icebreaker [1984, 627-638] Model tests in ice of a Canadian Coast Guard R-class icebreaker [1984, 627-638] MP 1716 Laboratory investigation of the kinetic friction coefficient of ice [1984, p.19-28] Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker [1984, 199-28] Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker [1985, 13p.] CR 85-22	Low temperature phase changes in montmorillouite and nontronite at high water contents and high salt contents [1980, p.139-144] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NMR [1982, p.115-121] Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26] Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.76] Effect of unconfined loading on the unfrozen water content of Manchester silt [1983, 17p.] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] MP 1664 Water migration due to a temperature gradient in frozen soil (1983, p.51-956) Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, 8p.] Transport of water in frozen soil. 3. Experimental determination of soil-water diffusivity under isothermal conditions [1983, 8p.] Transport of water in frozen soil. 3. Experimental conditions [1983, 8p.] Transport of water in frozen soil. 3. Experimental conditions [1983, 8p.] Transport of water in frozen soil. 3. Experimental conditions [1983, 8p.] Transport of water in frozen soil. 4. Analysis of experimental results on the effects of ice content [1984, p.54-66] MP 1841 Effects of soluble sels on the unfrozen water content of frozen soils determined by nuclear magnetic resonance of frozen soils determined by nuclear magnetic resonance.
CR 76-49 Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts [1976, 34p.] CR 76-48 Stekaly, J.L. Watershed modeling in cold regions: an application to the Sleepers River Research Watershed in northeastern Vermont [1980, 241p.] MP 1471 Stebneshech, K.D. Dynamics of frazil ice formation [1984, p.161-172] MP 1829 Sterm, P.C. Limnological investigations: Lake Koocanusa, Montana, Part 3: Basic data, post-impoundment, 1972-1978 [1982, 597p.] SR 82-23 Strahler, A.H. Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-530] Strahler, A.H. Repetitive loading tests on membrane enveloped road sections during freeze thaw (1977, p.171-197) Repetitive loading tests on membrane enveloped road sections during freeze thaw cycles [1978, p.1277-1285] Nondestructive testing of in-service highway pavements in Maine [1979, 22p.] Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway [1984, 28p.] Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 77-15 Repetitive loading tests on membrane-enveloped road sections during freeze-thaw cycles [1978, 16p.] CR 78-12 Design procedures for underground heat sink systems [1979, 186p. in "ur. pagna.] SR 79-08 Sullivan, J.M., Jr. Finite element simulation of ice crystal growth in subcooled sodium-chloride solutions [1985, p.527-532] MP 2100 Boonomics of ground freezing for management of uncon-	and initial conditions: analysis [1985, 28p.] SR 85-66 Tanfi, E.X. Soli microbiology [1981, p.38-44] Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] MP 1753 Evaluation of a compartmental model for prediction of nitrate leaching losses [1981, 24p.] Mathematical simulation of nitrogen interactions in soils [1983, p.241-248] Tankin, R.S. Computer simulation of bubbler-induced melting of ice covers using experimental heat transfer results [1978, p.362-366] MP 1160 Tastillo, T.J. Hydraulic model study of a water intake under frazil ice conditions [1981, 11p.] CR 81-03 Tattaclanz, J.C. Laboratory investigation of the mechanics and hydraulics of river ice jams [1976, 97p.] Laboratory investigation of the mechanics and hydraulics of river ice jams [1977, 45p.] Compressive and shear strengths of fragmented ice coveral laboratory study [1977, 45p.] Mean characteristics of asymmetric flows: application to flow below ice jams [1981, p.342-350] In-situ measurements of the mechanical properties of ice [1982, p.326-334] Determination of the flexural strength and elastic modulus of ice from in situ cantillever-beam tests [1982, p.37-47] MP 1558 Asymmetric plane flow with application to ice jams [1983, p.1540-1556] Model tests on two models of WTGB 140-foot icebreaker (1984, 17p.) Loe resistance tests on two models of the WTGB icebreaker (1984, p.627-638] Model tests in ice of a Canadian Coast Guard R-class icebreaker (1984, p.627-638) Model tests in ice of a Canadian Coast Guard R-class icebreaker (1984, p.627-638) MP 1825 Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker (1984, p.627-638) Kinetic friction coefficient of ice [1985, 40p.] Research of the kinetic friction coefficient of sea ice-1985, 20p.] Level ice breaking by a simple wedge [1985, 46p.]	Low temperature phase changes in montmorillouite and nontronite at high water contents and high salt contents [1980, p.139-144] MP 1336 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance [1980, p.400-412] MP 1412 Relationship between the ice and unfrozen water phases in frozen soil as determined by pulsed nuclear magnetic resonance and physical desorption data [1982, 8p.] CR 82-15 Comparison of unfrozen water contents measured by DSC and NIMR [1982, p.115-121] MP 1994 Method for measuring enriched levels of deuterium in soil water [1982, 12p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1982, p.221-226] Transport of water in frozen soil. 2. Effects of ice on the transport of water under isothermal conditions [1983, p.15-26) MP 1629 Relationship between the ice and unfrozen water places in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.74-6] MP 1632 Effect of unconfined loading on the unfrozen water content of Manchester silt [1983, 17p.] Soil-water diffusivity of unsaturated frozen soils at subzero temperatures [1983, p.889-893] Water migration due to a temperature gradient in frozen soil [1983, 8p.] Transport of water in frozen soil. 1. Experimental determination of soil-water diffusivity under isothermal conditions [1983, 8p.] Transport of water in frozen soil. 3. Experiments on the effects of ice content [1984, p.28-34] Effects of low temperatures on the growth and unfrozen water content of fects of soluble selts on the unfrozen water content of the Lanzhou, P.R.C., silt [1984, 18p.] CR 84-14 Effects of magnetic particles on the unfrozen water content of frozen soils determined by nuclear magnetic resonance all [1984, p.58-66] MP 1798 Effects of magnetic particles on the unfrozen water content of frozen soils determined by nuclear magnetic resonance [1984, p.58-66] MP 1799 Deuterium diffusion in a soil-water-ice mixture [1984,

Experimental measurement of channeling of flow in porous	Designing with wood for a lightweight air-transportable Arc-	Application of a numerical see ice model to the Bast Green-
media [1985, p.394-399] MP 1967 Effects of soluble salts on the unfrozen water contents of the	tic shefter: how the materials were tested and chosen for design r1982, p.385-397; MP 1558	land area [1982, 40p.] CR 82-16 Comparison of different sea level pressure analysis fields in
Lanzhou, PRC, silt (1985, p.99-109) MP 1933	Roof moisture surveys: current state of the technology	the East Greenland Sea (1983, p.1084-1088)
Water migration in unsaturated frozen morin clay under lin-	[1983, p.24-31] MP 1628 Locating wet cellular plastic insulation in recently construct-	MP 1737 Comparison of sea ice model results using three different wind
ear temperature gradients (1985, p.111-122) MP 1934	ed roots [1983, p.168-173] MCP 1729	forcing fields [1983, 11p.] CR 83-17
Experimental study on factors affecting water migration in frozen morin clay r1985, p.123-128, MP 1897	Can wet roof insulation be dried out [1983, p.626-639] MIP 1569	CRREL investigations relevant to offshore petroleum produc- tion in ice-covered waters [1983, p.207-215]
frozen morin clay (1985, p.123-128) MP 1897 Thawing of frozen clays (1985, p.1-9) MP 1923	Comparison of serial to on-the-roof infrared moisture surveys	MP 2006
Soil-water potential and unfrozen water content and tempera-	[1983, p.95-105] MIP 1769	Current procedures for forecasting aviation icing [1983, 31p.]
ture [1985, p.1-14] MP 1932 Prediction of unfrozen water contents in frozen soils by a two-	Water supply and waste disposal on permanent anow fields (1984, p.401-413) MP 1714	31p. ₁ SR 83-24 Atmospheric boundary-layer modification, drag coefficient,
point or one-point method [1985, p.83-87] MIP 1929	Secondary stress within the structural frame of DYE-3: 1978-	and surface heat flux in the antarctic marginal ice zone
Tien, C.	1983 (1984, 44p.) SR 84-26 Wetting of polystyrene and urethane roof insulations in the	[1984, p.649-661] MIP 1667 Some simple concepts on wind forcing over the marginal ice
Approximate analysis of melting and freezing of a drill hole through an ice shelf in Antarctics (1975, p.421-432)	laboratory and on a protected membrane roof (1984, 9p. +	zone (1984, p.43-48) MIP 1783
MP 361	figs.; MP 2011 Water supply and waste disposal on permanent snowfields	Variation of the drag coefficient across the Antarctic marginal ice zone (1984, p.63-71) MP 1784
Heat transfer characteristics of melting and refreezing a drill hole through an ice shelf in Antarctics [1976, 15p.] CR 76-12	[1985, p.344-350] MP 1792	Method of detecting voids in rubbled ice [1984, p.183-188]
	Condensation control in low-slope roofs [1985, p.47-59] MP 2839	MP 1772 On small-scale horizontal variations of salinity in first-year
Tiessen, L.L. Ecological effects of oil spills and seepages in cold-dominated	Roof moisture surveys: yesterday, today and tomorrow	sea ice [1984, p.6505-6514] MEP 1761
environments [1971, p.61-65] MIP 905	[1985, p.438-443 + figs.] MIP 2040	Structure of first-year pressure ridge sails in the Prudhoe Bay region (1984, p.115-135) MP 1837
Seasonal cycles and relative levels of organic plant nutrients under Arctic and alpine conditions (1971, p.55-57)	Aerial roof moisture surveys [1985, p.424-425] MIP 2022	Determining the characteristic length of floating ice sheets by
MP 304	Airborne roof moisture surveys [1986, p.45-47]	moving loads (1985, p.155-159) MP 1855
Comparative investigation of periodic trends in carbohydrate and lipid levels in Arctic and alpine plants [1972, p.40-45]	MP 2139 Protected membrane roofing systems [1986, p.49-50]	Preliminary simulation study of sea ice induced gouges in the sea floor (1985, p.126-135) MP 1917
MP 1376	MP 2140	Kadluk ice stress messurement program [1985, p.88-100]
Vegetative research in arctic Alsaka [1973, p.169-198] MP 1000	Lessons learned from examination of membrane roofs in Alas- ka [1986, p.277-290] MIP 2003	MP 1899 Physical properties of sea ice in the Greenland Sea (1985,
Arctic ecosystem: the coastal tundra at Barrow, Alaska	Vapor drive maps of the U.S.A. (1986 7p. + graphs)	p.177-188 ₁ MP 1963
[1980, 57[p.] MP 1355	MP 2041	Numerical simulation of ice gauge formation and infilling on the shelf of the Beaufort Sea (1985, p.393-407)
Analysis of processes of primary production in tundra growth forms (1981, p.285-356) MP 1433	Tobin, T.M. Technique for producing strain-free flat surfaces on single	MP 1904
Tilten, P.	crystals of ice: comments on Dr. H. Bader's letter and Dr.	Pressure ridge morphology and physical properties of sea ice in the Greenland Sea (1985, p.214-223) MP 1935
Extending the useful life of DYE-2 to 1986. Part 2: 1979 findings and final recommendations [1980, 37p.]	K. Itagaki's letter (1973, p.519-520) MP 1000 Mass transfer along ice surfaces observed by a groove relaxa-	in the Greenland Sea [1985, p.214-223] MIP 1935 Numerical simulation of sea ice induced gouges on the shelves
SR 90-13	tion technique [1977, p.34-37] MIP 1091	of the polar oceans [1985, p.259-265] MP 1938
Ting, J.M. Application of the Andrade equation to creep data for ice and	Tensits, H. Survey of airport pevement distress in cold regions (1986,	Tucker, W.B., III Sea ice properties [1984, p.82-83] MP 2136
frozen soil (1979, p.29-36) MP 1802	p.41-50 ₁ MP 2002	Tuinetra, R.L.
Toblasson, W.	Trackler, G.M.	Near real time hydrologic data acquisition utilizing the LANDSAT system [1975, p.200-211] MIP 1055
CRREL is developing new snow load design criteris for the United States [1976, p.70-72] MP 947	USACRREL precise thermistor meter [1985, 34p.] SR 85-26	Landset data collection platform at Devil Canyon site, upper
Life-cycle cost effectiveness of modular megastructures in	Trivett, N.B.A.	Susitna Basin, Alaska—Performance and analysis of data (1979, 17 refs.) SR 79-02
cold regions (1976, p.760-776) MP 892 CRREL roof moisture survey, Pease AFB Buildings 33, 116,	Snowpack estimation in the St. John River basin (1980, p.467-486) MP 1799	(1979, 17 reft.) SR 79-02 Turner, G.A.
122 and 205 (1977, 10p.) SR 77-92	· ·	
	Troth, J.L.	Attenuation and backscatter for snow and sleet at 96, 140, and
Update on snow load research at CRREL [1977, p.9-13]	Upland aspen/birch and black apruce stands and their litter	225 GHz (1984, p.41-52) MP 1864
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-		225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.)
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with urea-formalde-hyde foam [1977, p.478-487] MP 958	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alasks (1976, p.33-44) MP 867 Tryds, P.	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Front Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1822
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p.33-44] MP 867	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Front Effects Laboratory Approach reads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Corps of Engineers Building under cold climates and on permafron; collection of
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with urea-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Maintaining, buildings in the Arctic [1977, p.244-25]	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska [1976, p.33-44] MP 867 Tryds, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] Standardized testing methods for measuring mechanical prop-	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permatrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR
Update on snow load research at CRREL [1977, p.9-13) MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Maintainina buildings in the Arctic [1977, p.244-251] MMP 1390 Infrared detective: thermograms and roof moisture [1977,	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryds, F. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Front Effects Laboratory Approach reads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Corps of Engineers Building under cold climates and on permafron; collection of
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with urea-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintaining buildings in the Arctic [1977, p.244-251] MP 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] MP 961	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska [1976, p.33-44] MP 867 Tryds, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1856 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) SR 36-46 U.S. Army CRREL/WES/FESA Roof Moisture Research Team
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] MP 958 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MMP 1396 Infrared detective: thermograms and roof moisture [1977,	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alasks (1976, p.33-44) MP 867 Tryds, P. Intermittent ice forces acting on inclined wedges (1977, 26p.) CR 77-26 Standardized testing methods for measuring mechanical properties of ice (1981, p.245-254) MP 1856 Tackser, W.B. Classification and variation of sea ice ridging in the Arctic basin (1974, p.127-146) MP 1822	225 GHz [1944, p.41-52] MP 1864 U.S. Arctic Construction and Front Effects Laboratory Approach roads, Greenland 1955 program [1959, 100p.] MP 1522 U.S. Army Cerps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] U.S. Army CRREL/WES/FESA Roaf Meisture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army [1978, 8p.] SR 78-01
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formaldehyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-27] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1590 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Areenal [1977, 6.9.] Roof moisture survey: ten State of New Hampshire buildings	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska [1976, p.33-44] MP 867 Tryds, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1836 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554]	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Roof Moisture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] MP 958 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.24-231] MP 1508 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 203 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.) CR 77-31	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryds, F. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] Tucker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1022 Measurement of sea ice drift far from abore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Front Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Cerps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CEREL/WES/FESA Roof Medicture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-27] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1390 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Aree-nal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] Construction on permafrost at Longyearbyen on Spitabergen [1978, p.884-890] MP 1168	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p. 33-44]. MP 867 Tryde, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135]	225 GHz [1944, p.41-52] MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program [1959, 100p.] MP 1522 U.S. Army Cerps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] U.S. Army CRREL/WES/FESA Roof Moisture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army [1978, 8p.] U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] RE 38-46
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with urea-formalde-hyde foam [1977, p.478-487] MP 1390 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MMP 1390 Infrared detective: thermograms and roof moisture [1977, p.41-44] MMP 961 CRREL roof moisture survey, Building 208 Rock laland Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] CR 77-31 Construction on permafrost at Longyearbyen on Spitabergen [1978, p.884-890] MP 1108 Details behind a typical Alaskan pile foundation [1978,	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska (1976, p. 33-44). MP 867 Tryde, F. Intermittent ice forces acting on inclined wedges (1977, 26p.) CR 77-26 Standardized testing methods for measuring mechanical properties of ice (1981, p.245-254) MF 155- Tucker, W.B. Classification and variation of sea ice ridging in the Arctic basin (1974, p.127-146) MF 1822 Measurement of sea ice drift far from abore using LANDSAT and serial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.15-135) MP 1659	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Cerps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CEREL/WES/FESA Roof Moisture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] MP 958 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-231] MP 1508 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 203 Rock Island Arsenal [1977, 6p.] CR. Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] Construction on permafrost at Longyearbyen on Spitsbergen [1978, p.884-890] MP 1108 Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared cam-	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p. 33-44]. MP 867 Tryda, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1022 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135] MP 1059 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.159-595-	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Lemingrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Roof Meisture Research Tests Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Lemingrad, USSR (1980, 365p.) U.SSoviet Joint Seminar on Building under Cold Climates and on Permafrost, Lemingrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with urea-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Maintainina buildings in the Arctic [1977, p.244-251] Mff 1390 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] CR 7-31 Construction on permafrost at Longyearbyen on Spitabergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.49-A15] MF 1213	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska (1976, p. 33-44), MP 867 Tryds, P. Intermittent ice forces acting on inclined wedges (1977, 26p.) CR 77-26 Standardized testing methods for measuring mechanical properties of ice (1981, p.245-254) MP 1856 Tecker, W.B. Classification and variation of sea ice ridging in the Arctic basin (1974, p.127-146) MP 1822 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.113-135) MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.59-609) MP 866	225 GHz [1944, p.41-52] MP 1864 U.S. Arctic Construction and Front Effects Laboratory Approach roads, Greenland 1955 program [1959, 100p.] MP 1522 U.S. Army Cerps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] U.S. Army CEREL/WES/FESA Roof Medicture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army [1978, 8p.] U.S. Department of Houston and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] U.SSoviet Joint Seminar on Building under Cold Climates and on Permafrost, Leningrad, June 24-29, 1979
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] MP 1390 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1598 Infrared detective: thermograms and roof moisture [1977, p.41-44] Roof moisture survey, Building 208 Rock Island Arsenal [1977, 69.] CRREL roof moisture survey; Building 208 Rock Island Arsenal [1977, 29p.] CR 77-31 Construction on permafrost at Longyearbyen on Spittsbergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p. 33-44]. MP 867 Tryds, F. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1556 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1022 Measurement of sea ice drift far from abore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135], MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] Sessonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 960	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Reaf Medicture Research Tests Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSoviet Joint Sensinar on Building under Cold Climates and on Permafrost, Leningrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) USSR (1980, 365p.) SER 86-40 Utha, I.
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] MP 1958 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] Cnstruction on permafrost at Longyearbyen on Spitabergen [1978, p.884-890] Detaits behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.49-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.]	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska (1976, p. 33-44). MP 867 Tryds, P. Intermittent ice forces acting on inclined wedges (1977, 26p.) CR 77-26 Standardized testing methods for measuring mechanical properties of ice (1981, p.245-254) MP 1856 Tecker, W.B. Classification and variation of sea ice ridging in the Arctic basin (1974, p.127-146) MP 1822 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.113-135) MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) MP 266 Seasonal variations in apparent sea ice viscosity on the geophysical scale (1977, p.87-90) Computer routing of unsaturated flow through snow (1977)	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach reads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Reaf Mediature Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Seminar on Building under Cold Climates and on Permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint seminar, Leningrad, USSR (1980, 365p.) UMB, L. On modeling mesoscale ice dynamics using a viscous plastic.
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Maintainina buildings in the Arctic [1977, p.244-251] Milliant buildings in the Arctic [1977, p.24-251] Milliant and detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] Construction on permafrost at Longyearbyen on Spitubergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.49-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arens roof [1979, 32p.]	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska [1976, p. 33-44]. MP 867 Tryda, F. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MF 1556 Tucker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MF 1922 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135] MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 866 Computer routing of unsaturated flow through snow [1977, 44p.] Studies of the movement of coastal sea ice near Prudhoe Bay,	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1322 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Roof Medicture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sendner on Building under Cold Climates and on Permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sendner on Building under Cold Climates and on Permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Udba, I. On modeling mesoscale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1526 On forecasting mesoscale ice dynamics and build-up (1983,
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1506 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] Construction on permafrost at Longyearbyen on Spitubergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.49-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arena roof [1979, 32p.]	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska (1976, p. 33-44). MP 867 Tryds, P. Intermittent ice forces acting on inclined wedges (1977, 26p.) CR 77-26 Standardized testing methods for measuring mechanical properties of ice (1981, p.245-254) MP 1856 Tecker, W.B. Classification and variation of sea ice ridging in the Arctic basin (1974, p.127-146) MP 1822 Measurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.113-135), MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale (1977, p.87-90) MP 900 Computer routing of unasturated flow through snow (1977, 44p.) Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. (1977, p.833-546) MP 1866	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Roof Moisture Research Tesm Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Seminar on Building under Cold Climates and on Permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Seminars and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint seminar, Leningrad, USSR (1980, 365p.) UMB, I. On modeling mesoscale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1526 On forecasting mesoscale ice dynamics and build-up (1983, p.110-115) MP 1625
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] MP 1390 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Maintainina buildings in the Arctic [1977, p.244-251] Mff 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] CR 7-31 Construction on permafrost at Longyearbyen on Spitabergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.49-415] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arena roof [1979, 32p.] SR 79-09 Roof moisture survey—U.S. Military Academy [1979, 8 1979, 8 1979, 8 1979, 8 1979, 8 1979, 16	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryda, P. Intermittent ice forces acting on inclined wedges [1977, 26p.1] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1856 Tackser, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1822 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135] MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] Computer routing of unsaturated flow through snow [1977, 44p.] Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.333-546] Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23] 11 MF 1162	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Reaf Medicture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Hessing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSoviet Joint Seminar on Building under Cold Chanstes and on Permafrost, Leningrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSoviet joint seminar, Leningrad, U
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] MP 1390 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainin_ buildings in the Arctic [1977, p.244-251] MP 1598 Infrared detective: thermograms and roof moisture [1977, p.41-44] MP 961 CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 69.] CR 77-43 Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] CR 77-31 Construction on permafrost at Longyearbyen on Spittsbergen [1978, p.884-890] MP 1168 Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arens roof [1979, 32p.] SR 79-09 Roof moisture survey—U.S. Military Academy [1979, 8	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska (1976, p. 33-44). MP 867 Tryds, P. Intermittent ice forces acting on inclined wedges (1977, 26p.) CR 77-26 Standardized testing methods for measuring mechanical properties of ice (1981, p.245-254) MP 1856 Tecker, W.B. Classification and variation of sea ice ridging in the Arctic basin (1974, p.127-146) MP 1822 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) MP 960 Computer routing of unsaturated flow through snow (1977, 44p.) SR 77-10 Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. (1977, p.333-546) MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska (1977, p.23-31) MP 1162 Characterization of the surface roughness and floe geometry	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Proot Effects Laboratory Approach reads, Greenland 1955 program (1959, 100p.) Approach reads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CREEL/WES/FESA Reaf Mediture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Seminar on Building under Cold Chastes and on Permafrost, Leningrad, USSR (1980, 365p.) U.SSoviet Joint seminar, Leningrad, USSR (1980, 365p.) U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Udia, I. On modeling mesoscale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1526 On forecasting mesoscale ice dynamics and build-up (1983, p.110-115) MP 1625 Ueda, H.T. Portable instrument for determining snow characteristics related to trafficability (1972, p.193-204) MP 886
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arasenal [1977, 6p.] Roof moisture survey: ten State of New Hampahire buildings [1977, 29p.] CR 77-31 Construction on permafrost at Longyearbyen on Spitabergen [1978, p.884-890] Detaits behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.49-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arena roof [1979, 32p.] SR 79-09 Roof moisture survey—U.S. Military Academy [1979, 1979, p.117-124] SR 79-15 Snow studies associated with the sideways move of DYE-3 [1979, p.117-124] Extending the useful life of DYE-2 to 1986, Part 1: Prelimi-	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska (1976, p. 33-44), MP 867 Tryde, P. Intermittent ice forces acting on inclined wedges (1977, 26p.) CR 77-26 Standardized testing methods for measuring mechanical properties of ice (1981, p.245-254) MP 1856 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin (1974, p.127-146) MP 1822 Measurement of sea ice drift far from abore using LANDSAT and serial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.113-135) MP 869 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale (1977, p.87-90) MP 866 Computer routing of unsaturated flow through snow (1977, 44p.) Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. (1977, p.333-546) Nershore ice motion near Prudhoe Bay, Alaska (1977, p.333-1) MP 1162 Characterization of the surface roughness and floe geometry of the sea ice over the continental abelves of the Beaufort and Chukchi Seas (1977, p.32-41) MP 1163	225 GHz (1984, p.41-32) MP 1864 U.S. Arctic Construction and Proot Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Reaf Moisture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Hessing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSoviet Joint Seminar on Building under Cold Chanstes and on Permafrost, Leningrad, USSR (1980, 365p.) Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSoviet joint seminar (1980, 1997, 1998) U.SSoviet joint seminar (1998, 1997, 1998, 19
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] MP 1390 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainin, buildings in the Arctic [1977, p.244-251] MP 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] Roof moisture survey, Building 208 Rock Island Arsenal [1977, 69.] CR REL roof moisture survey, Building 208 Rock Island Arsenal [1977, 29.] CR 77-31 Construction on permafrost at Longyearbyen on Spittsbergen [1978, p.884-890] MP 1168 Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arens roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1979, 8 79-09] Roof moisture survey—U.S. Military Academy [1979, 8 79-16] Snow studies associated with the sideways move of DYE-3 [1979, p.117-124] MP 1312	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryda, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1856 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1822 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.153-135] MP 1059 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 900 Computer routing of unsaturated flow through snow [1977, 44p.] Standardized for the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.33-546] Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23-31] MP 1162 Characterization of the surface roughness and floe geometry of the sea ice over the continental shelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1163 Bramination of the viscous wind-driven circulation of the	225 GHz (1984, p.41-32) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Roof Moisture Surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Seminar on Building under Cold Climates and on Permafrost, Leningrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Udb., L. On modeling mesoscale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1526 On forecasting mesoscale ice dynamics and build-up (1983, p.110-115) Uela, H.T. Portable instrument for determining snow characteristics related to trafficability (1972, p.193-204) Delineation and engineering characteristics of permafrost related to trafficability (1972, p.193-204) MP 1377 Resurvey of the "Byrd" Station, Antarctics, drill hole (1976)
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] MP 1958 Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1506 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] Construction on permafrost at Longyearbyen on Spitsbergen [1978, p.884-890] Detaits behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.49-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arena roof [1979, 32p.] SR 78-29 Roof moisture survey—U.S. Military Academy [1979, 8] Snow studies associated with the sideways move of DYE-3 [1979, p.117-124] Extending the useful life of DYE-2 to 1986, Part I: Preliminary findings and recommendations [1979, 15p.] SR 79-27 CRREL roof moisture survey, Pease AFB buildings 35, 63,	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p. 33-44]. MP 867 Tryde, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1856 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1822 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.15-135] MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 900 Computer routing of unsaturated flow through snow [1977, 149-1] Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.33-346] MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23-31] Characterization of the surface roughness and floe geometry of the sea ice over the continental abelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1163 Examination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-135] MP 983	225 GHz (1984, p.41-52) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1322 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Reaf Moisture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSoviet Joint Seminar on Building under Cold Chambes and on Permafrost, Leningrad, USSR (1980, 365p.) U.SSoviet Joint seminar, Leningrad, USSR (1980, 365p.) William L. On modeling mesoscale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1826 On forecasting mesoscale ice dynamics and build-up (1983, p.110-115) MP 1625 Uséa, E.T. Portable instrument for determining snow characteristics related to trafficability (1972, p.193-204) Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1976, p.391-408) MP 1377 Resurvey of the "Byrd" Station, Antarctica, drill hole (1976, p.29-34) Operational report: 1976 USACRREL-USGS subsea perma-
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1598 Mintainina buildings in the Arctic [1977, p.244-251] MP 1598 Infrared detective: thermograms and roof moisture [1977, p.41-44] Roof moisture survey, Building 203 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] CR 77-31 Construction on permafrost at Longyearbyen on Spitsbergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arena roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1979, 8 79-09] Roof moisture survey—U.S. Military Academy [1979, 8 79-16] Snow studies associated with the sideways move of DYB-3 [1979, p.117-124] Estending the useful life of DYB-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] SR 79-17 CRREL roof moisture survey, Pease AFB buildings 35, 63, 93, 112, 113, 120 and 220 [1980, 31p.] SR 78-18	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p. 33-44]. MP 867 Tryde, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1856 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1822 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.15-135] MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 900 Computer routing of unsaturated flow through snow [1977, 149-1] Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.33-346] MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23-31] Characterization of the surface roughness and floe geometry of the sea ice over the continental abelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1163 Examination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-135] MP 983	225 GHz (1984, p.41-32) MP 1864 U.S. Arctic Construction and Frost Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1322 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Reaf Mediture Research Tesm Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Heasing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Seminar on Building under Cold Climates and on Permafrost, Leningrad, June 1980, 365p.) Udla, I. On modeling mesocale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1526 On forecasting mesocale ice dynamics and build-up (1983, p.110-115) WP 1526 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1976, p.391-408) MP 286 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Ses, Alsaka (1976, 20p.)
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.24-251] MP 1500 Infrared detective: thermograms and roof moisture [1977, p.41-44] Roof moisture survey, Building 203 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] Construction on permafrost at Longyearbyen on Spitzbergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, i.e., and rain load prior to the collapse of the Hartford Civic Center arena roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1979, 8 79-09] Roof moisture survey—U.S. Military Academy [1979, 8 79-16] Snow studies associated with the sideways move of DYE-3 [1979, p.117-124] Estending the useful life of DYE-2 to 1986, Part 1: Preliminary findings and finds recommendations [1979, 15p.] CRREL roof moisture survey, Pease AFB buildings 35, 63, 93, 112, 113, 120 and 220 [1980, 31p.] Estending the useful life of DYE-2 to 1986, Part 2: 1979 findings and final recommendations [1980, 37p.]	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p. 33-44]. MP 867 Tryda, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1856 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1822 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.151-135] MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 869 Computer routing of unsaturated flow through snow [1977, 197-19] Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.33-546] MP 1966 Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23-31] Characterization of the surface roughness and floe geometry of the sea ice over the continental shelves of the Beaufort and Chukchi Seas [1977, p.32-41] Ramination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-133] Computer model of municipal snow removal [1977, p.29-3-17-30]	225 GHz [1944, p.41-52] MP 1864 U.S. Arctic Construction and Proot Effects Laboratory Approach roads, Greenland 1955 program [1959, 100p.] Approach roads, Greenland 1955 program [1959, 100p.] MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] U.S. Army CRREL/WES/FESA Reaf Medicture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army [1978, 8p.] U.S. Department of Housing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] U.SSoviet Joint Seminar on Building under Cold Chantes and on Permafrost, Leningrad, USSR [1980, 365p.] Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] Udin, I. On modeling mesoscale ice dynamics using a viscous plastic constitutive law [1981, p.1317-1329] MP 1526 On forecasting mesoscale ice dynamics and build-up [1983, p.110-115] Ueda, E.T. Portable instrument for determining snow characteristics related to trafficability [1972, p.193-204] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea [1976, p.391-408] MP 1377 Resurvey of the "Byrd" Station, Antarctica, drill hole [1976, p.29-34] Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alsaka [1976, 20p.] SER 76-12
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1506 Infrared detective: thermograms and roof moisture [1977, p.41-44] Roof moisture survey, Building 208 Rock Island Arsenal [1977, 69-] Roof moisture survey: ten State of New Hampshire buildings [1977, 29-] CR 77-31 Construction on permafrost at Longyearbyen on Spittsbergen [1978, p.884-890] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arens roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1978, 8 79-09 Roof moisture survey—U.S. Military Academy [1979, 8 79-16] Snow studies associated with the sideways move of DYE-3 [1979, p.117-124] Extending the useful life of DYE-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] CRREL roof moisture survey, Pease AFB buildings 35, 59, 3, 112, 113, 120 and 220 [1980, 31p.] SR 99-14 Extending the useful life of DYE-2 to 1986, Part 2: 1979 findings and final recommendations [1980, 37p.]	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryde, F. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1556 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1022 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 249 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135] MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 800 Computer routing of unsaturated flow through snow [1977, 44p.] SE 77-10 Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.333-546] MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23-31] Characterization of the surface roughness and floe geometry of the sea ice over the continental shelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1162 Examination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-133] Computer simulation of urban snow removal [1977, p.95-133-302]	225 GHz [1944, p.41-32] MP 1864 U.S. Arctic Construction and Proot Effects Laboratory Approach reads, Greenland 1955 program [1959, 100p.] MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafront; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] U.S. Army CRREL/WES/FESA Reaf Mediture Research Tests Recommendations for implementing roof moisture surveys in the U.S. Army [1978, 8p.] U.S. Department of Heasing and Urban Development Building under cold climates and on permafront; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR [1980, 365p.] U.SSoviet Joint Seminar on Building under Cold Climates and on Permafront, Leningrad, June 24-29, 1979 Building under cold climates and on permafront; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR 80-40 Udba, I. On modeling mesocale ice dynamics using a viscous plastic constitutive law [1981, p.1317-1329] MP 1526 On forecasting mesocale ice dynamics and build-up [1983, p.110-115] Ueba, H.T. Portable instrument for determining snow characteristics related to trafficability [1972, p.193-204, MP 1865 Delineation and engineering characteristics of permafront beneath the Beaufort Sea [1976, p.391-408] MP 1377 Resurvey of the "Byrd" Station, Antarctica, drill hole [1976, p.29-34] Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska [1976, 20p.] SR 76-12 Delineation and engineering characteristics of permafront beneath the Beaufort Sea, Alaska [1976, 20p.] SR 76-12
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1598 Mintainina buildings in the Arctic [1977, p.244-251] MP 1598 Infrared detective: thermograms and roof moisture [1977, p.41-44] Roof moisture survey, Building 203 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] Construction on permafrost at Longyearbyen on Spitsbergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arena roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1979, 8 79-09] Roof moisture survey—U.S. Military Academy [1979, 8 79-16] Snow studies associated with the sideways move of DYB-3 [1979, p.117-124] Estending the useful life of DYB-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] SR 79-17 CRREL roof moisture survey, Pease AFB buildings 35, 63, 93, 112, 113, 120 and 220 [1980, 31p.] SR 79-18 Estending the useful life of DYB-2 to 1986, Part 2: 1979 findings and final recommendations [1980, 37p.] SR 79-19 SR 79	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p. 33-44]. MP 867 Tryda, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1856 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1822 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.153-135]. MP 1059 Techniques for studying sea ice drift and deformation as tiste far from land using LANDSAT imagery [1976, p.595-609] Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] Computer routing of unsaturated flow through snow [1977, 44p.] Standardized the movement of coastal sea ice near Prudhoc Bay, Alaska, U.S.A. [1977, p.33-546] Narathore ice motion near Prudhoc Bay, Alaska [1977, p.23-31] Characterization of the surface roughness and floe geometry of the sea ice over the continental shelves of the Beaufort and Chukchi Seas [1977, p.32-41] Ramination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-133, MP 1163 Computer model of municipal snow removal [1977, p.95-133, MP 183 Computer simulation of urban snow removal [1977, p.29-302] Computer simulation of urban snow removal [1977, p.29-302] Computer simulation of urban snow removal [1977, p.29-302] CR 77-30	U.S. Arctic Construction and Front Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Cerps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Reef Meisture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urben Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Seviet Joint Sentinar on Building under Cold Climates and on Permafrost, Laningrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sentinar on Building under Cold Climates and on Permafrost, Laningrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Udia, I. On modeling mesoscale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1526 On forecasting mesoscale ice dynamics and build-up (1983, p.110-115) Usia, E.T. Portable instrument for determining snow characteristics related to trafficability (1972, p.193-204) MP 1625 Usia, E.T. Portable instrument for determining snow characteristic related to trafficability (1972, p.193-204) MP 1836 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea, Alaska (1976, 20p.) SR 76-12 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea, Alaska (1976, 20p.) SR 76-12 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1976, p.53-60) MP 919 Haines-Pairbanks pipeline: design, construction and opera- tion (1977, 20p.)
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Maintainina buildings in the Arctic [1977, p.244-251] MfP 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] CR 77-31 Construction on permafrost at Longyearbyen on Spitubergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arens roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1979, 8 R 79-09] Roof moisture survey—U.S. Military Academy [1979, 8 R 79-16] Snow studies associated with the sideways move of DYB-3 [1979, p.117-124] Extending the useful life of DYE-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] CR 78-17 CRREL roof moisture survey, Pease AFB buildings 35, 63, 93, 112, 113, 120 and 220 [1980, 31p.] SR 79-18 Roof leaks in cold regions: School at Chevak, Alaska [1980, 12p.] Roofs in cold regions: Marson's Store, Claremont, New	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryda, F. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MF 1856 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MF 1922 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135]. MF 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] MP 866 Seasonal variations in apparent sea ice viscosity on the goophysical scale [1977, p.87-90] MP 866 Seasonal variations of unsaturated flow through snow [1977, 44p.] Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.333-546] MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23-31] Alsaka, U.S.A. [1977, p.333-546] MP 1066 Characterization of the surface roughness and flox geometry of the sea ice over the continental shelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1162 Cammination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.93-133] MP 963 Computer model of municipal snow removal [1977, p.93-133] Computer simulation of urban snow removal [1979, p.293-302] NP 1238 Soa ice ridging over the Alaskan continental shelf [1979, 24p.] Some results from a linear-viscous model of the Arctic ice	U.S. Arctic Construction and Proot Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1960, 365p.) U.S. Army CRREL/WES/FESA Reaf Medicture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Heasing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1960, 365p.) U.SSeviet Joint Sendaner on Building under Cold Climates and on Permafrost, Leningrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sendaner on Building under Cold Climates and on Permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Udba, I. On modeling mesoscale ice dynamics using a viscous plastic constitutive law [1981, p.1317-1329] MP 1526 On forecasting mesoscale ice dynamics and build-up [1983, p.110-115] Ueba, E.T. Portable instrument for determining snow characteristics related to trafficability (1972, p.193-204) Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1976, p.391-408) MP 1976 Resurvey of the "Byrd" Station, Antarctica, drill hole (1976, p.29-34) Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska (1976, 20p.) SR 76-12 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1976, p.33-60) MP 919 Haines-Fairbanks pipeline: design, construction and operation (1977, 20p.) Delineation and engineering characteristics of permafrost beneath and engineering characteristics of permafrost beneath and engineering characteristics of permafrost beneath and engineering characteristics of permafrost
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1598 Maintainina buildings in the Arctic [1977, p.244-251] MP 1598 Infrared detective: thermograms and roof moisture [1977, p.41-44] Roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] CR 77-31 Construction on permafrost at Longyearbyen on Spittsbergen [1978, p.884-8890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arena roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1979, 8 79-09] Roof moisture survey—U.S. Military Academy [1979, 8 79-15] Snow studies associated with the sideways move of DYE-3 [1979, p.117-124] Estending the useful life of DYE-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] SR 79-17 CRREL roof moisture survey, Pease AFB buildings 35, 63, 93, 112, 113, 120 and 220 [1980, 31p.] SR 79-18 Estending the useful life of DYE-2 to 1986. Part 2: 1979 findings and final recommendations [1980, 37p.] SR 79-19 Roof leaks in cold regions: Marson's Store, Claremont, New Marroshire [1980, 13p.] SR 89-13 Roofs in cold regions: Marson's Store, Claremont, New Marroshire [1980, 119.] MP 1488	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryde, F. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1556 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MF 1622 Measurement of sea ice drift far from abore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135] MF 1639 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.83-546] MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska, U.S.A. [1977, p.33-546] MP 1162 Characterization of the surface roughness and floe geometry of the sea ice over the continental shelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1163 Ezamination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-133] MP 963 Computer model of municipal snow removal [1977, p.95-133] MP 963 Computer simulation of urban snow removal [1977, p.95-133] MP 963 Computer simulation of urban snow removal [1977, p.95-133] MP 963 Computer simulation of urban snow removal [1977, p.95-133] MP 963 Computer simulation of urban snow removal [1977, p.95-133] MP 963 Computer forms a linear-viscous model of the Arctic ice cover [1979, p.293-304] MP 1238 Sea ice ridging over the Alaskan continental shelf [1979, 24p.] CR 77-36 Some results from a linear-viscous model of the Arctic ice cover [1979, p.293-304]	U.S. Arctic Construction and Front Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafront; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CRREL/WES/FESA Reaf Meisture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Development Building under cold climates and on permafront; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sentings on Building under Cold Climates and on permafront; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sentings on Building under Cold Climates and on permafront; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Udia, I. On modeling mesoscale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1526 On forecasting mesoscale ice dynamics and build-up (1983, MP 1625) Ueda, B.T. Portable instrument for determining snow characteristics related to trafficability (1972, p.193-204) Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1976, p.391-408) RP 284 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska (1976, 20p.) SR 76-01 Delineation and engineering characteristics of permafrost teneath the Beaufort Sea (1977, p.234-237) Delineation and engineering characteristics of permafrost toneath the Beaufort Sea (1977, p.234-237) Delineation and engineering characteristics of permafrost toneath the Beaufort Sea (1977, p.234-237) Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1977, p.234-237) Delineation and engineering characteristics of permafront toneath the Beaufort Sea (1977, p.234-237) Delineation and engineering characteristics of permafrost
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.48-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Maintainina buildings in the Arctic [1977, p.244-251] MfP 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] CR 77-31 Construction on permafrost at Longyearbyen on Spitubergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arens roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1979, 82 79-09] Roof moisture survey—U.S. Military Academy [1979, 82 79-16] Snow studies associated with the sideways move of DYE-3 [1979, p.117-124] Extending the useful life of DYE-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] SR 79-27 CRREL roof moisture survey, Pease AFB buildings 35, 63, 93, 112, 113, 120 and 220 [1980, 31p.] SR 99-13 Roof leaks in cold regions: School at Chevak, Alaska [1980, 12p.] Roofs in cold regions: Marson's Store, Claremont, New Hampshire [1980, 13p.] MP 1408 Moisture gain and its thermal consequence for common roof	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryda, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1856 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1922 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135] MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 866 Nearshore ice motion near Prudhoe Bay, Alaska, U.S.A. [1977, p.333-546] MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23-31] MP 1162 Characterization of the surface roughness and fice geometry of the sea ice over the continental abelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1163 Examination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.91-133] MP 983 Computer model of municipal snow removal [1977, p.93-133] MP 983 Computer simulation of urban snow removal [1979, p.29-302] Sea ice ridging over the Alaskan continental shelf [1979, p.29-304] Sea ice ridging over the Alaskan continental shelf [1979, p.29-304] Sea ice ridging over the Alaskan continental shelf [1979, p.885-4897] MP 1248	U.S. Arctic Construction and Proot Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1960, 365p.) U.S. Army CRREL/WES/FESA Reaf Medicture Research Team Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Heasing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1960, 365p.) U.SSeviet Joint Sensinar on Building under Cold Climates and on Permafrost, Leningrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sensinar on Building under Cold Climates and on Permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Udba, I. On modeling mesoscale ice dynamics using a viscous plastic constitutive law [1981, p.1317-1329] MP 1526 On forecasting mesoscale ice dynamics and build-up [1983, p.110-115] Ueba, E.T. Portable instrument for determining anow characteristics related to trafficability (1972, p.193-204; Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1976, p.391-408) MP 1876 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska (1976, 20p.) SR 76-12 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1977, p.336-337) Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1977, p.336-397) Delineation and engineering characteristics of permafrost beneath the Beaufort Sea (1977, p.338-395) MP 1672
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] Roof moisture survey, Building 208 Rock Island Arsenal [1977, 69.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29.] CR 77-31 Construction on permafrost at Longyearbyen on Spittsbergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and ram load prior to the collapse of the Hartford Civic Center arens roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1978, 8 79-09] Roof moisture survey—U.S. Military Academy [1979, 8 79-16] Snow studies sesociated with the sideways move of DYE-2 [1979, p.117-124] Extending the useful life of DYE-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] CRREL roof moisture survey, Pease AFB buildings 35, 63, 93, 112, 113, 120 and 220 [1980, 31p.] Roof leaks in cold regions: School at Chevak, Alaska [1980, 12p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire [1980, 13p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire [1980, 13p.] Roof in cold regions [1980, 21p.] MP 1361 Venting of built-up roofing systems [1981, p.16-21]	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryde, F. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1556 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MF 1622 Measurement of sea ice drift far from abore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135] MF 1639 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.83-546] MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska, U.S.A. [1977, p.33-546] MP 1162 Characterization of the surface roughness and floe geometry of the sea ice over the continental shelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1163 Ezamination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-133] MP 963 Computer model of municipal snow removal [1977, p.95-133] MP 963 Computer simulation of urban snow removal [1977, p.95-133] MP 963 Computer simulation of urban snow removal [1977, p.95-133] MP 963 Computer simulation of urban snow removal [1977, p.95-133] MP 963 Computer simulation of urban snow removal [1977, p.95-133] MP 963 Computer forms a linear-viscous model of the Arctic ice cover [1979, p.293-304] MP 1238 Sea ice ridging over the Alaskan continental shelf [1979, 24p.] CR 77-36 Some results from a linear-viscous model of the Arctic ice cover [1979, p.293-304]	U.S. Arctic Construction and Proot Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafront; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1960, 365p.) U.S. Army CRREL/WES/FESA Reaf Mediture Research Tests Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Heasing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1960, 365p.) U.SSoviet Joint Seminar on Building under Cold Climates and on Permafrost, Leningrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Udba, I. On modeling mesocale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1526 On forecasting mesocale ice dynamics and build-up (1983, p.110-115) Ueba, H.T. Portable instrument for determining snow characteristics related to trafficability (1972, p.193-204) MP 1977 Resurvey of the "Byrd" Station, Antarctica, drill hole (1976, p.29-34) Operational report: 1976 USACRREL-USGS subsea permafrost beneath the Beaufort Sea (1976, p.391-408) MP 1977 Delineation and engineering characteristics of beneath the Beaufort Sea (1977, p.34-237) Delineation and engineering characteristics of beneath the Beaufort Sea (1977, p.33-35) MP 1674 Lock wall deicing with high velocity water jet at Soo Locks, Mi (1977, p.23-35) Locks Mi (1977, p.23-35)
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.48-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Maintainina buildings in the Arctic [1977, p.244-251] MfP 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] CRREL roof moisture survey, Building 208 Rock Island Arsenal [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29p.] CR 77-31 Construction on permafrost at Longyearbyen on Spitubergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and rain load prior to the collapse of the Hartford Civic Center arens roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1979, 82 79-09] Roof moisture survey—U.S. Military Academy [1979, 82 79-16] Snow studies associated with the sideways move of DYE-3 [1979, p.117-124] Extending the useful life of DYE-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] SR 79-27 CRREL roof moisture survey, Peasse AFB buildings 35, 63, 93, 112, 113, 120 and 220 [1980, 31p.] Roof leaks in cold regions: school at Chevak, Alaska [1980, 12p.] Roof in cold regions: Marson's Store, Claremont, New Harnoshire [1980, 13p.] Roof in cold regions: Marson's Store, Claremont, New Harnoshire [1980, 13p.] Roof in cold regions (1980, 21p.) MP 1498 Wentling of built-up roofing systems (1981, p.16-21) Venting of built-up roofing systems (1981, p.16-21)	Upland aspen/birch and black spruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryda, P. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1556 Tackser, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1922 Measurement of sea ice drift far from shore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135] MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.833-546] MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska, U.S.A. [1977, p.333-546] MP 1067 Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23-31] MP 1162 Characterization of the surface roughness and floe geometry of the sea ice over the continental shelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1163 Ramination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-133] MP 983 Computer model of municipal snow removal [1977, p.29-302] MP 1238 Sea ice ridging over the Alaskan continental shelf [1979, p.485-4897] MP 1240 Application of a numerical sea ice model to the East Greenland area [1981, 109p.] MP 1236 Preliminary results of ice modeling in the East Greenland area [1981, 109p.]	U.S. Arctic Construction and Proot Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Carps of Engineers Building under cold climates and on permafront; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1960, 365p.) U.S. Army CRREL/WES/FESA Reaf Mediture Research Tests Recommendations for implementing roof moisture surveys in the U.S. Army (1978, 8p.) U.S. Department of Heasing and Urban Development Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1960, 365p.) U.SSoviet Joint Seminar on Building under Cold Climates and on Permafrost, Leningrad, June 24-29, 1979 Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) Udba, I. On modeling mesocale ice dynamics using a viscous plastic constitutive law (1981, p.1317-1329) MP 1526 On forecasting mesocale ice dynamics and build-up (1983, p.110-115) Ueba, H.T. Portable instrument for determining snow characteristics related to trafficability (1972, p.193-204) MP 1977 Resurvey of the "Byrd" Station, Antarctica, drill hole (1976, p.29-34) Operational report: 1976 USACRREL-USGS subsea permafrost beneath the Beaufort Sea (1976, p.391-408) MP 1977 Delineation and engineering characteristics of beneath the Beaufort Sea (1977, p.34-237) Delineation and engineering characteristics of beneath the Beaufort Sea (1977, p.33-35) MP 1674 Lock wall deicing with high velocity water jet at Soo Locks, Mi (1977, p.23-35) Locks Mi (1977, p.23-35)
Update on snow load research at CRREL [1977, p.9-13] MP 1142 Reinsulating old wood frame buildings with ures-formalde-hyde foam [1977, p.478-487] Hand-held infrared systems for detecting roof moisture [1977, p.261-271] MP 1390 Maintainina buildings in the Arctic [1977, p.244-251] MP 1596 Infrared detective: thermograms and roof moisture [1977, p.41-44] Roof moisture survey, Building 208 Rock Island Arsenal [1977, 69.] Roof moisture survey: ten State of New Hampshire buildings [1977, 29.] CR 77-31 Construction on permafrost at Longyearbyen on Spittsbergen [1978, p.884-890] Details behind a typical Alaskan pile foundation [1978, p.891-897] Detecting wet roof insulation with a hand-held infrared camera [1978, p.A9-A15] Summary of Corps of Engineers research on roof moisture detection and the thermal resistance of wet insulation [1978, 6p.] Estimated snow, ice, and ram load prior to the collapse of the Hartford Civic Center arens roof [1979, 32p.] Roof moisture survey—U.S. Military Academy [1978, 8 79-09] Roof moisture survey—U.S. Military Academy [1979, 8 79-16] Snow studies sesociated with the sideways move of DYE-2 [1979, p.117-124] Extending the useful life of DYE-2 to 1986, Part 1: Preliminary findings and recommendations [1979, 15p.] CRREL roof moisture survey, Pease AFB buildings 35, 63, 93, 112, 113, 120 and 220 [1980, 31p.] Roof leaks in cold regions: School at Chevak, Alaska [1980, 12p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire [1980, 13p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire [1980, 13p.] Roof in cold regions [1980, 21p.] MP 1361 Venting of built-up roofing systems [1981, p.16-21]	Upland aspen/birch and black apruce stands and their litter and soil properties in interior Alaska [1976, p.33-44]. MP 867 Tryde, F. Intermittent ice forces acting on inclined wedges [1977, 26p.] CR 77-26 Standardized testing methods for measuring mechanical properties of ice [1981, p.245-254] MP 1556 Tacker, W.B. Classification and variation of sea ice ridging in the Arctic basin [1974, p.127-146] MP 1622 Measurement of sea ice drift far from abore using LANDSAT and serial photographic imagery [1975, p.541-554] MP 249 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation [1976, p.115-135] MP 1659 Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609] MP 866 Seasonal variations in apparent sea ice viscosity on the geophysical scale [1977, p.87-90] MP 800 Computer routing of unsaturated flow through snow [1977, 44p.] Studies of the movement of coastal sea ice near Prudhoe Bay, Alaska, U.S.A. [1977, p.333-546] MP 1066 Nearshore ice motion near Prudhoe Bay, Alaska [1977, p.23-31] Characterization of the surface roughness and floe geometry of the sea ice over the continental abelves of the Beaufort and Chukchi Seas [1977, p.32-41] MP 1162 Examination of the viscous wind-driven circulation of the Arctic ice cover over a two year period [1977, p.95-133] Computer model of municipal snow removal [1977, p.95-133] Computer model of municipal snow removal [1977, p.95-133] Computer simulation of urban snow removal [1977, p.95-133-302] Soa ice ridging over the Alaskan continental shelf [1979, p.485-4897] MP 1248 Soa ice ridging over the Alaskan continental shelf [1979, p.485-4897] MP 1248 Soa ice ridging over the Alaskan continental shelf [1979, p.485-4897] MP 1533	U.S. Arctic Construction and Front Effects Laboratory Approach roads, Greenland 1955 program (1959, 100p.) Approach roads, Greenland 1955 program (1959, 100p.) MP 1522 U.S. Army Cerps of Engineers Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.S. Army CEREL/WES/FESA Roof Moisture Surveys in the U.S. Army (1978, 8p.) U.S. Department of Housing and Urban Devalogment Building under cold climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sentiner on Building under Cold Climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sentiner on Building under Cold Climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSeviet Joint Sentiner on Building under Cold Climates and on permafrost; collection of papers from a U.SSoviet joint seminar, Leningrad, USSR (1980, 365p.) U.SSoviet joint seminar (Leningrad, USSR (1980, 365p.)

Veda, H.T. (cont.)	VanDevender, J.P.	Use of radio frequency sensor for snow/soil moisture water content measurement [1983, p.33-42] MP 1689
197" CRREL-USGS permafrost program Beaufort Sea, Alaska, operational report (1977, 19p.) SR 77-41	Effect of X-ray irradiation on internal friction and dielectric relaxation of ice [1983, p.4314-4317] MP 1670	East Greenland Sea ice variability in large-scale model simu-
Delineation and engineering characteristics of permafrost	VanPelt, D.J.	lations [1984, p.9-14] MP 1779
beneath the Beaufort Sea [1977, p.518-521] MP 1201	Thermal diffusivity of frozen soil [1980, 30p.]	Model simulation of 20 years of northern hemisphere sea-ice fluctuations [1984, p.170-176] MP 1767
Flexural strength of ice on temperate lakes—comparative tests of large cantilever and simply supported beams [1978,	Varetta, R.	Numerical simulation of Northern Hemisphere sea ice varia-
14p. ₁ CE 78-69	Approximate solution to Neumann problem for soil systems	bility, 1951-1980 (1985, p.4847-4865) MP 1882
Investigation of the snow adjacent to Dye-2, Greenland	(1981, p.76-81) MP 1494	Wang, L.RL.
[198], 23p.] SR 81-03	Vanifevskala, V.D. Turker and appleases seils algel a 139 179.	Life-cycle cost effectiveness of modular megastructures in cold regions [1976, p.760-776] MIP \$92
Movement study of the trans-Alaska pipeline at selected sites (1981, 32p.) CR 81-84	Tundra and analogous soils (1981, p.139-179) MP 1405	Wang, T.P.
Secondary stress within the structural frame of DYE-3: 1978-	Vandrey, K.	Laboratory investigation of the mechanics and hydraulies of
1983 [1984, 44p.] SR 84-26	4th report of working group on testing methods in ice [1984, p.1-41] MP 1886	river ice jams [1976, 97p.] MP 1060 Laboratory investigation of the mechanics and hydraulics of
Heat recovery from primary effluent using heat pumps [1985, p.199-203] MF 1978	p.1-41 ₁ MP 1886 Vandrey, K.D.	river ice jams [1977, 45p.) CR 77-89
Ugolini, F.C.	Standardized testing methods for measuring mechanical prop-	Watermen, S.E.
Ionic migration and weathering in frozen Antarctic soils	erties of ice [1981, p.245-254] MP 1556	Snowpack estimation in the St. John River besin [1980, p.467-486] MP 1799
[1973, p.461-470] MP 941 Examining anteretic soils with a scanning electron micro-	Veal, D.L. Propane dispenser for cold fog dissipation system [1973,	Waters, R.G.
scope (1976, p.249-252) MP 931	38p. ₁ MP 1033	Preliminary evaluation of 88 years rapid infiltration of raw
Antarctic soil studies using a scanning electron microscope	Veen, J.A. vin	municipal sewage at Calumet, Michigan (1977, p.489- 510) MIP 976
[1978, p.106-112] MIP 1386 Ulga, A.	Soil microbiology [1981, p.38-44] MP 1753 Verville, W.P.	Watta, J.
Let's consider land treatment, not land disposal (1976, p.60-	Subsurface explorations in permafrost areas (1959, p.31-41)	U.S. tundra biome publication list (1983, 29p.) SR 83-29
62 ₁ MP 869	MP 885	Wayneberg, J.A.
Wastewater reuse at Livermore, California (1976, p.511-531) MP 879	Veum, A.K. Soil properties of the International Tundra Biome sites	Visual observations of floating ice from Skylab [1977, p.353-
Wastewater treatment in cold regions (1976, 15p.)	[1974, p.27-48] MP 1943	379 ₁ MP 1263
MP 965	Viereck, L.	Webber, P.J. Effects of low-pressure wheeled vehicles on plant communi-
Overview of land treatment from case studies of existing sys-	Recovery and active layer changes following a tundra fire in	ties and soils at Prudhoe Bay, Alaska (1977, 49p.)
tems [1976, 26p.] MP #91 Peasibility study of land treatment of wastewater at a subarc-	northwestern Alasks (1983, p.543-547) MP 1660 Vinces, T.S.	SR 77-17
tic Alaskan location (1976, 21p.) MP 868	Survey of airport pavement distress in cold regions [1986,	Effects of crude and diesel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sen-
Preliminary evaluation of \$8 years rapid infiltration of raw	p.41-50 ₁ MP 2002	sitivity maps (1978, p.242-259) MIP 1184
municipal newage at Calumet, Michigan (1977, p.489- 510; MP 976	Visch, E. Resid infliencing of primary services officers at East Dayses.	Tundra disturbances and recovery following the 1949 ex-
Fessibility study of land treatment of wastewater at a subarc-	Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts (1976, 34p.) CR 76-48	ploratory drilling, Fish Creek, Northern Alaska (1978, 81p.) CR 78-28
tic Alaskan location [1977, p.533-547] MIP 1268	Ven Brndsky, P.	Geobotanical atlas of the Prudhoe Bay region, Alaska 1980,
Wastewater reuse at Livermore, California [1977, p.511-531] MP 979	Uniform snow loads on structures (1982, p.2781-2798) MP 1574	69p. ₃ CR 80-14 Coastal tundra at Barrow (1980, p.1-29) MP 1356
Ullerstig, A.	Wolhems, P.	Coastal tundra at Barrow (1980, p.1-29) MP 1356 Landsat-assisted environmental mapping in the Arctic Na-
On modeling mesoscale ice dynamics using a viscous plastic	MIZEX-a program for mesoscale air-ice-ocean interaction;	tional Wildlife Refuge, Alaska [1982, 39p. + 2 maps]
constitutive law (1981, p.1317-1329) MIP 1526	experiments in Arctic marginal ice zones. 1. Research strategy (1981, 20p.) SR 81-19	CR 82-37 Sensitivity of plant communities and soil flors to seswater
On forecasting mesoscale ice dynamics and build-up (1983, p.110-115) MP 1625	strategy (1981, 20p.) SR 81-19 MIZEX—a program for mesoscale air-ice-ocean interaction	spills, Prudhoe Bay, Alaska [1983, 35p.] CR 83-24
Unger, S.G.	experiments in Arctic marginal ice zones. 2. A science	Reconnaissance observations of long-term natural vegetation
Preliminary analysis of water equivalent/anow characteristics	plan for a summer Marginal Ice Zone Experiment in the Pram Strait/Greenland Sea: 1984 [1983, 47p.]	recovery in the Cape Thompson region, Alaska, and additions to the checklist of flors [1985, 75p.] CR 85-11
using LANDSAT digital processing techniques (1977, 16 leaves) MP 1113	SR 83-12	Webster, W.J., Jr.
Snow cover mapping in northern Maine using LANDSAT	Ice properties in the Greenland and Barents Seas during sum-	Results of the US contribution to the Joint US/USSR Bering
dinisal managania a saskalawan -1070 107 108-		
digital processing techniques (1979, p.197-198)	mer (1983, p.142-164) MIP 2862 Marginal ice zones: a description of air-ice-ocean interactive	Sea Experiment [1974, 197p.] MP 1632
MP 1510	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-	Weeks, W.F.
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data r1983, p.535-	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments [1984, p.133-146] MIP 1673	Weeks, W.F. Salinity variations in sea ice [1974, p.109-122] MP 1023
MP 1510 Extraction of topography from side-looking satellite system— a case study with SPOT simulation data [1983, p.535-550] MP 1695	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1020
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535-550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model-	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MIZEX—a program for mesoscale sir-ice-ocean interaction apperiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 199-) SR 85-86	Weeks, W.F. Salinity variations in sea ice [1974, p.109-122] MP 1023
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover dats into the Saginaw River Basin geographic information system for hydrologic model- ing [1984, 19p.] SR 84-01	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments [1984, p.133-146] MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West [1985, 119p.] Walker, B.D.	Weeks, W.F. Selimity variations in sea ice [1974, p.109-122] MP 1023 Towing icebergs [1974, p.2] MP 1020 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) [1974, p.119-138] Remote sensing program required for the AIDJEX model
MP 1810 Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1695 Integration of Landaat land cover dats into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstainer, N.	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MIZEX—a program for mesoscale sir-ice-ocean interaction apperiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 199-) SR 85-86	Weeks, W.F. Salinity variations in sea ice [1974, p.109-122] MP 1023 Towing icebergs [1974, p.2] Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) [1974, p.119-138] MP 1035 Remote sensing program required for the AIDJEX model [1974, p.22-44] MP 1040
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover dats into the Saginaw River Basin geographic information system for hydrologic model- ing [1984, 19p.] SR 84-01	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1944, p.133-146) MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1465 Walker, D.A.	Weeks, W.F. Selimity variations in sea ice [1974, p.109-122] MP 1023 Towing icebergs [1974, p.2] MP 1020 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) [1974, p.119-138] Remote sensing program required for the AIDJEX model
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model- ing [1984, 19p.] Unterstales, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] Urban, N.W.	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments [1984, p.133-146] MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils [1981, p.139-179] MP 1465 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communi-	Weeks, W.F. Salimity variations in sea ice [1974, p.109-122] MP 1023 Towing icebergs [1974, p.2] Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) [1974, p.119-138] MP 1035 Remote sensing program required for the AIDJEX model [1974, p.22-44] Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations [1975, p.853-877] MP 1885
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535-550] Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 199.] Unterstainer, N. Using sea ice to measure vertical heat flux is the ocean [1982, p.2071-2074] Urban, N.W. Land treatment systems and the environment [1979, p.201-	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1944, p.133-146) MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1465 Walker, D.A.	Weeks, W.F. Salinity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1029 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, MP 1885) Remote sensing plan for the AIDJEX main experiment
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstainer, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] MP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1414	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MP 1673 MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) SR 85-96 Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) MP 1035 Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535-550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 199.] Extraction of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 199.] Unterstainer, N. Uning sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] Urban, N.W. Land treatment systems and the environment [1979, p.201-225] Utt, M.E. lee wroperties in a grounded man-made ice island [1986,	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1944, p. 133-146) MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) SR 85-96 Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonety, Alaska (1978, 63p.)	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1020 MP 1035 Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imasery (1975, p.51-554)
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstainer, N. Using sea ice to measure vertical heat flux in the ocean (1982, p.2071-2074) Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1414 Utt, M.E. Ice vroperties in a grounded man-made ice island [1986, p.135-142] MP 2832	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments [194, p.133-146] MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West [1985, 119p.] SR 85-86 Walker, B.D. Tundra and analogous soils [1981, p.139-179] MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1978, 63p.] Effects of crude and dissel oil spill on plant communities are rudehoe Bay, Alaska, and the derivation of oil spill sen-	Weeks, W.F. Selimity variations in sea ice [1974, p.109-122] MP 1023 MP 1023 MP 1020 MP 842 Measurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery [1975, p.541-54] MP 849
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1693 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model- ing [1984, 199-] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean MP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1414 Utt, M.E. Ice woperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E.	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) SR 85-96 Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) Effects of crude and diseel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) MP 1184	Weeks, W.F. Selinity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1029 Meso-scale strain measurements on the Beaufourt sea pack cice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) In the Companies in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135)
MP 1516 Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstainer, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] Urban, N.W. Land treatment systems and the environment [1979, p.201-225] MP 1414 Utt, M.E. loe vroperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] CR 76-15	Marginal ice zones: a description of air-ice-ocean interactive processes, models and plasaned experiments [1984, p.133-146] MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West [1985, 119p.] Walker, B.D. Tundra and analogous soils [1981, p.139-179] MP 1465 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1978, 63p.] Effects of crude and diesel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sensitivity maps [1978, p.242-259] Geobottanical stilse of the Prudhoe Bay region, Alaska [1980,	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) In P 1040 Ice dynamics in the Canadian Archipelago and sdjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-155) MP 1659
MP 1510 Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1693 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean MP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201-225] MP 1414 Utt, M.E. Ice woperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Berg, A.	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MP 1673 MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) SR 78-16 Effects of crude and diesel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) MP 1184 Geobotanical stles of the Prudhoe Bay region, Alaska (1980, 69p.) Landsat-assisted environmental mapping in the Arctic Na-	Weeks, W.F. Selinity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1029 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) In the Aid of the Aid of the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) MP 1849 Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1639 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.)
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model- ing [1984, 199.] Untegrationser, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] MP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1414 Utt, M.E. lee woperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a litera- ture review [1976, 329.] Van des Berg, A. Hand-held infrared systems for detecting roof moisture	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) SR 85-86 Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Biffects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) MP 1184 Geobotanical stlass of the Prudhoe Bay region, Alaska (1980, 69p.) Landsat-assisted environmental mapping in the Arctic National Wildliffs Refuge, Alaska (1982, 59p. + 2 maps)	Wesks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1639 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites
MP 1510 Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1693 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 199.] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean MP 1521 [1982, p.2071-2074] Urban, N.W. Land treatment systems and the environment [1979, p.201-225] MP 1414 Utt, M.E. Ice woperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Berg, A. Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A.	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MP 1673 MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1465 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) SR 78-16 Effects of crude and diesel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill spill Geobotanical stlas of the Prudhoe Bay region, Alaska (1980, 69p.) Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska (1982, 59p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater	Weeks, W.F. Selinity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1029 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) In the Aid of the Aid of the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) MP 1849 Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1639 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.)
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1693 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model- ing [1984, 19p.] Unterstainer, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] MP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1414 Utt, M.E. loe woperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a litera- ture review [1976, 32p.] Van dem Berg, A. Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments [1944, p.133-146] MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West [1955, 119p.] Walker, B.D. Tundra and analogous soils [1981, p.139-179] MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17 Biffects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1978, 63p.] Effects of crude and diesel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sensitivity maps [1978, p.242-259] Geobotanical sites of the Prudhoe Bay region, Alaska [1980, 69p.] Landsat-assisted environmental mapping in the Arctic National Wildlife Refuse, Alaska [1982, 59p. + 2 maps] CR 82-37 Sensitivity of plant communities and soil flora to seawster spills, Frudhoe Bay, Alaska [1983, 35p.) CR 83-24	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying ses ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) MP 1380
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model- ing [1984, 19p.] Unterstales, N. Using sea ice to measure vertical heat flux in the ocean (1982, p.2071-2074) MP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201- 225) Utt, M.E. Ice woperties in a grounded man-made ice island [1986, p.135-142) Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Cleve, A. Hand-heid infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] MP 1830	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MP 1673 MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) SR 85-96 Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Biffects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) SR 78-16 Biffects of crude and diesel oil spill on plant communities at Prudeboe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) Geobotanical stles of the Prudhoe Bay region, Alaska (1980, 69p.) CR 88-14 Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska (1982, 39p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska (1983, 35p.) CR 83-24 Vegetation and environmental gradients of the Prudhoe Bay	Weeks, W.F. Salinity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1029 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and serial photographic imagery (1975, p.54-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery [1976, p.595-609) NP 846 MP 1330 Imaging radar observations of frozen Arctic lakes (1976,
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1693 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model- ing [1984, 19p.] Unterstainer, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] MP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1414 Utt, M.E. loe woperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a litera- ture review [1976, 32p.] Van dem Berg, A. Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MP 1673 MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) SR 85-96 Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) SR 78-16 Effects of crude and diesel oil spill on plant communities at Prudeboe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) Geobotanical sties of the Prudhoe Bay region, Alaska (1980, 69p.) CR 83-14 Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska (1982, 59p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater	Wesks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and sdjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and serial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1659 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic lakes (1976, p.169-175) MP 1284
MP 1510 Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1693 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstalear, N. Using sea ice to measure vertical heat flux in the ocean mP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201-225] MP 1414 Utt, M.E. Ice woperties in a grounded man-made ice island [1986, p.135-142] Van Cheva, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Cheva, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Cheva, E. Reland-held infrared systems for detecting roof moisture (1977, p.261-271) Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, 9p. +	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MP 1673 MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) SR 85-96 Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) SR 78-16 Effects of crude and diesel oil spill on plant communities at Prudeboe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) Geobotanical sties of the Prudhoe Bay region, Alaska (1980, 69p.) Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska (1982, 59p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska (1983, 35p.) CR 83-14 Walker, B.J. Morphology of the North Slope (1973, p.49-52)	Weeks, W.F. Salinity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1029 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.54-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.15-135) MP 1695 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic lakes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) Sea ice properties and seometry (1976, p.13-171)
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1414 Utt, M.E. Ice reoperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van dew Berg, A. Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Van Develle, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, p.241-189.] MP 2011	Marginal ice zones: a description of air-ice-ocean interactive processes, models and plasmed experiments [1984, p.133-146] MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-Wost [1985, 119p.] Walker, B.D. Tundra and analogous soils [1981, p.139-179] MP 1465 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1978, 63p.] Effects of crude and diesel oil spill on plant communities at Prudhoe Bay, Alaska, and the derivation of oil spill sensitivity maps [1978, p.242-259] Landsat-assisted environmental mapping in the Arctic National Wildlife Revage, Alaska [1982, 59p. + 2 maps] CR 83-14 Vegetation and environmental gradients of the Prudhoe Bay, region, Alaska [1983, 35p.] CR 83-24 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska [1985, 239p.] CR 85-14 Walker, H.J. Morphology of the North Slope [1973, p.49-52] MP 1984	Weeks, W.F. Salimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.2-44) Iteles of the AIDJEX model (1974, p.22-44) Iteles of the AIDJEX model (1974, p.2-44) Remote sensing plan for the AIDJEX main experiment with the same and etermined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment MP 862 Measurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1659 Thickness and roughness variations of arctic multiper sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic lakes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 1284 Sea ice properties and geometry (1976, p.137-171) MP 918
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstalear, N. Using sea ice to measure vertical heat flux in the ocean (1982, p.2071-2074) Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1521 Utt, M.E. Ice woperties in a grounded man-made ice island [1986, p.135-142) Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van den Berg, A. Hand-held infrared systems for detecting roof moisture (1977, p.261-271) Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, 9p. + figs.] Van Wyhe, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1944, p. 133-146) MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities at Prudeboe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) Geobotanical stles of the Prudhoe Bay region, Alaska (1980, 69p.) CR 88-14 Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska (1982, 39p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska (1983, 35p.) CR 83-14 Walker, H.J. Morphology of the North Slope (1973, p.49-52) MP 1884 Walker, K.E. Suppression of ice fog from the Port Wainwright, Alaska,	Weeks, W.F. Salinity variations in sea ice (1974, p.109-122) MP 1023 Towing icebergs (1974, p.2) MP 1029 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.54-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.15-135) MP 1695 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic lakes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) Sea ice properties and seometry (1976, p.13-171)
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] Urban, N.W. Land treatment systems and the environment [1979, p.201- 225- MP 1414 Utt, M.E. Ice veoperties in a grounded man-made ice island [1986, p.135-142] Van Cleva, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van dem Berg, A. Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Van Develle, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, p.24-16g.] Van Wyba, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) MP 1834	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities at Prudeboe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) Geobotanical atlas of the Prudhoe Bay region, Alaska [1980, 69p.) Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska [1982, 59p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska [1983, 35p.) CR 82-37 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska (1985, 239p.) Walker, H.J. Morphology of the North Slope (1973, p.49-52) MP 1864 Walker, E.E. Suppression of ice fog from the Port Wainwright, Alaska,	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) MP 1885 Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1695 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) MP 1380 Imaging radar observations of frozen Arctic takes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 922 Sea ice conditions in the Arctic (1976, p.173-205)
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic model- ing [1984, 19p.] Unterstainer, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] MP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1414 Utt, M.E. loe woperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Genser, A. Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, 9p. + figs.] Van Wyhe, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) MP 1834 Vance, G.P.	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1984, p.133-146) MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities at Prudeboe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) Geobotanical atlas of the Prudhoe Bay region, Alaska [1980, 69p.) Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska [1982, 59p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska [1983, 35p.) CR 82-37 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska (1985, 239p.) Walker, H.J. Morphology of the North Slope (1973, p.49-52) MP 1864 Walker, E.E. Suppression of ice fog from the Port Wainwright, Alaska,	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1695 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) MP 1380 Imaging radar observations of frozen Arctic lakes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 912 Sea ice conditions in the Arctic (1976, p.173-205) MP 912 Dynamics of near-shore ice (1977, p.106-112) Dynamics of near-shore ice (1977, p.151-163)
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] Urban, N.W. Land treatment systems and the environment [1979, p.201- 225- MP 1414 Utt, M.E. Ice vroperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van dem Berg, A. Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Van Develle, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, p.24-1-469] Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, 9.7 + figs.] Van Pelt, D. Wetting of polystyrene Blair Lake, Alaska [1966, Various pagings) Vence, G.P. Investigation of ice clogged channels in the St. Marys River (1978, 73p.)	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments (1944, p. 133-146) MIZEX—a program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities at Prudeboe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) Geobotanical stles of the Prudhoe Bay region, Alaska (1980, 69p.) CR 88-14 Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska (1982, 39p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska (1983, 35p.) CR 83-14 Walker, H.J. Morphology of the North Slope (1973, p.49-52) MP 1884 Walker, K.E. Suppression of ice fog from the Port Wainwright, Alaska,	Wesks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1023 MP 1024 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Archice basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) MP 1026 Messurement of sea ice drift far from shore using LANDSAT and serial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) Thickness and roughness variations of arctic multityear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) MP 1389 MP 1380 MP 1389 MP 1380 MP 1380 MP 1284 MP 222 Sea ice properties and geometry (1976, p.173-171) MP 918 Sea ice conditions in the Arctic (1976, p.173-205) MP 919 Dynamics of near-shore ice (1977, p.106-112) Dynamics of near-shore ice (1977, p.106-112) Dynamics of near-shore ice (1977, p.151-163) MP 924 MP 1073
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535-550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 199-] Unterstainer, N. Using sea ice to measure vertical heat flux in the ocean (1982, p.2071-2074) When, N.W. Land treatment systems and the environment [1979, p.201-225] Uthan, N.W. Land treatment systems and the environment [1979, p.201-225] Why 1814 Utt, M.E. Ice woperties in a grounded man-made ice island [1986, p.135-142] Wm Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Cleve, E. Hand-heid infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, pp. + fgs.] Van Wyha, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Whys. G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Whys. G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Whys. G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Whys. G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Wetting of ice deflectors on the USCG icebresker Polar	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments [1944, p.133-146] MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West [1985, 119p.] Walker, B.D. Tundra and analogous soils [1981, p.139-179] MP 1465 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1978, 63p.] Effects of crude and diesel oil spill on plant communities and soils at Prudhoe Bay, Alaska plant communities are related by the series of crude and diesel oil spill on plant communities and relativity maps [1978, p.242-259] Geobotanical atlas of the Prudhoe Bay region, Alaska [1980, 69p.] CR 89-14 Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska [1982, 59p. + 2 maps] Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska [1983, 35p.] CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska [1983, 35p.] CR 83-14 Walker, E.E. Suppression of ice fog from the Fort Wainwright, Alaska, cooling pond [1982, 34p.] Walker, E.E. Suppression of ice fog from the Fort Wainwright, Alaska, cooling pond [1982, 34p.] SR 84-10 Walker, A.T. Let's consider land treatment, not land disposal [1976, p.60-	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.85-877) MP 1885 Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 862 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1695 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic takes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 918 Sea ice conditions in the Arctic (1976, p.13-171) MP 919 Sea ice conditions in the Arctic (1976, p.13-172) Dynamics of near-shore ice (1977, p.106-112) Dynamics of near-shore ice (1977, p.151-163) MP 1973 Interesting features of radar imagery of ice-covered North Slope takes (1977, p.129-136) MP 923
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean mP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1414 Utt, M.E. Ice reoperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Berg, A. Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams (1984, p.241-249) Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, 9p. + figs.] Van Wyhe, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Vance, G.P. Investigation of ice clogged channels in the St. Marys River (1978, 73p.) Evaluation of ice deflectors on the USCG icebreaker Polar Star [1980, 37p.]	Marginal ice zones: a description of air-ice-ocean interactive processes, models and plasaned experiments [1984, p.133-146] MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-Wost [1985, 119p.] Walker, B.D. Tundra and analogous soils [1981, p.139-179] MP 1465 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1978, 63p.] Effects of crude and dissel oil spill on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] Effects of crude and dissel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sensitivity maps [1978, p.242-259] Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska [1982, 59p. + 2 maps] CR 83-24 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska [1982, 35p.] CR 83-14 Walker, E.J. Morphology of the North Slope [1973, p.49-52] MP 1884 Walker, E.J. Suppression of ice fog from the Fort Wainwright, Alaska, cooling pond [1982, 34p.] SR 84-18 Walkes, A.T. Let's consider land treatment, not land disposal [1976, p.60-62] MP 869	Wesks, W.F. Salimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.2-44) In P 1040 Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.853-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1059 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) MP 1080 MP 1081 MP 1081 Interesting festures of radar imagery of ice-covered North MP 203 Integrated approach to the remote sensing of floating ice
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535-550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 199-] Unterstainer, N. Using sea ice to measure vertical heat flux in the ocean (1982, p.2071-2074) When, N.W. Land treatment systems and the environment [1979, p.201-225] Uthan, N.W. Land treatment systems and the environment [1979, p.201-225] Why 1814 Utt, M.E. Ice woperties in a grounded man-made ice island [1986, p.135-142] Wm Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Cleve, E. Hand-heid infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, pp. + fgs.] Van Wyha, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Whys. G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Whys. G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Whys. G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Whys. G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Wetting of ice deflectors on the USCG icebresker Polar	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments [1944, p.133-146] MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West [1985, 119p.] Walker, B.D. Tundra and analogous soils [1981, p.139-179] MP 1465 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1978, 63p.] Effects of crude and diesel oil spill on plant communities and soils at Prudhoe Bay, Alaska plant communities are related by the series of crude and diesel oil spill on plant communities and relativity maps [1978, p.242-259] Geobotanical atlas of the Prudhoe Bay region, Alaska [1980, 69p.] CR 89-14 Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska [1982, 59p. + 2 maps] Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska [1983, 35p.] CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska [1983, 35p.] CR 83-14 Walker, E.E. Suppression of ice fog from the Fort Wainwright, Alaska, cooling pond [1982, 34p.] Walker, E.E. Suppression of ice fog from the Fort Wainwright, Alaska, cooling pond [1982, 34p.] SR 84-10 Walker, A.T. Let's consider land treatment, not land disposal [1976, p.60-	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.85-877) MP 1885 Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 862 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1695 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic takes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 918 Sea ice conditions in the Arctic (1976, p.13-171) MP 919 Sea ice conditions in the Arctic (1976, p.13-172) Dynamics of near-shore ice (1977, p.106-112) Dynamics of near-shore ice (1977, p.151-163) MP 1973 Interesting features of radar imagery of ice-covered North Slope takes (1977, p.129-136) MP 923
MP 1516 Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean MP 1521 Urban, N.W. Land treatment systems and the environment [1979, p.201-225] MP 1414 Utt, M.E. loe vroperties in a grounded man-made ice island [1986, p.135-142] Van Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Berg, A. Hand-held infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the isboratory and on a protected membrane roof [1984, 9p. + figs.] Van Wybe, G. loe-cratering experiments Blair Lake, Alaska [1966, Various pagings) Vance, G.P. Investigation of ice clogged channels in the St. Marys River (1978, 73p.) Evaluation of ice deflectors on the USCG icebreaker Polar Star [1980, 37p.] Analysis of the performance of a 140-foot Great Lakes ice-breaker: USCGC Katmai Bay [1980, 28p.] CR 38-64 Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in Whitefish Bay and St. Marys River Characteristics of ice in W	Marginal ice zones: a description of air-ice-ocean interactive processes, models and plasaned experiments (1984, p.133-146) MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-Wost (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities and soils at Prudhoe Bay, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities at Prudhoe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-239) Landsat-assisted environmental mapping in the Arctic National Wildlife Revage, Alaska (1982, 39p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska (1983, 35p.) CR 83-24 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska (1985, 239p.) Walker, E.J. Morphology of the North Slope (1973, p.49-52) Walker, E.J. Walker, E.J. Walker, E.J. Suppression of ice fog from the Fort Wainwright, Alaska, cooling pond (1982, 34p.) Observations during BRIMFROST '83 (1984, 36p.) Walker, K.F. Let's consider land treatment, not land disposal (1976, p.60-62) Problems with rapid infiltration—a post mortem analysis (1984, 17p. + figs.) Walker, J.E.	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.85-877) MP 1585 Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1695 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic takes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 910 Dynamics of near-shore ice (1976, p.13-171) MP 911 Sea ice conditions in the Arctic (1976, p.13-171) MP 912 Sea ice conditions in the Arctic (1976, p.13-171) MP 913 Interesting features of radar imagery of ice-covered North Slope lakes (1977, p.129-136) MP 923 Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535-550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 199-] Unterstalese, N. Using sea ice to measure vertical heat flux in the ocean (1982, p.2071-2074) When, N.W. Land treatment systems and the environment [1979, p.201-225] Uthan, N.W. Land treatment systems and the environment [1979, p.201-225] When, N.W. Land treatment systems and the environment [1979, p.201-225] When, N.W. Land treatment systems and the environment [1979, p.201-225] When M.E. Ice woperties in a grounded man-made ice island [1986, p.135-142] Wan Cleve, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] CR 76-15 Van den Berg, A. Hand-heid infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] We Tilly Developed the performance of insulations in the laboratory and on a protected membrane roof [1984, pp. + fgs.] Van Wyha, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Whence, G.P. Investigation of ice clogged channels in the St. Marya River (1978, 73p.) Evaluation of ice deflectors on the USCG icebreaker Polar Str [1980, 37p.] Analysis of the performance of a 140-foot Great Lakes in Correct Lakes icebreaker: USCGC Katmai Bay [1980, 28p.]	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments [1944, p.133-146] MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West [1955, 119p.] Walker, B.D. Tundra and analogous soils [1981, p.139-179] MP 1485 Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17 Biffects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1978, 63p.] Effects of crude and diesel oil spill on plant communities an Prudehoe Bay, Alaska, and the derivation of oil spill sensitivity maps [1978, p.242-259] Geobotanical sites of the Prudhoe Bay region, Alaska [1980, 69p.] Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska [1982, 59p. + 2 maps]. CR 82-14 Landsat-assisted environmental gradients of the Prudhoe Bay region, Alaska [1983, 35p.) CR 82-22 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska [1985, 239p.] Walker, E.E. Suppression of ice fog from the Port Wainwright, Alaska, cooling pond [1982, 34p.) SR 82-22 Observations during BRIMFROST '83 [1984, 36p.] SR 84-19 Walkes, A.T. Let's consider land treatment, not land disposal [1976, p.60-62] Problems with rapid infiltration—a post mortem analysis (1984, 17p. + figs.) MF 1944 Walka, J.E. Development of a simplified method for field monitoring of	Weeks, W.F. Selimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.85-877) MP 1585 Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1695 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic takes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 910 Dynamics of near-shore ice (1976, p.13-171) MP 911 Sea ice conditions in the Arctic (1976, p.13-171) MP 912 Sea ice conditions in the Arctic (1976, p.13-171) MP 913 Interesting features of radar imagery of ice-covered North Slope lakes (1977, p.129-136) MP 923 Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-
MP 1516 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535- 550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] Urban, N.W. Land treatment systems and the environment [1979, p.201- 225] MP 1521 Utt, M.E. Ice reoperties in a grounded man-made ice island [1986, p.135-142] Van Cleva, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Cleva, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Develle, W.A. Field investigation of St. Lawrence River hanging ice dams MP 1390 Van Pett, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, pp. + figs.] Van Wyha, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Vanca, G.P. Investigation of ice clogged channels in the St. Marys River (1978, 73p.) Evaluation of ice deflectors on the USCG icebreaker Polar Star [1980, 37p.] Analysis of the performance of a 140-foot Great Lakes icebreaker: USCGC Katmai Bay [1980, 28p.] Characteristics of ice in Whiteflah Bay and St. Marys River during January, February and March 1979 [1980, 27p.] SR 39-32 Clearing ice-clogged shipping channels [1980, 13p.] Clearing ice-clogged shipping channels [1980, 13p.]	Marginal ice zones: a description of air-ice-ocean interactive processes, models and plasaned experiments (1984, p.133-146) MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-Wost (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities and soils at Prudhoe Bay, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities at Prudhoe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-239) Landsat-assisted environmental mapping in the Arctic National Wildlife Revage, Alaska (1982, 39p. + 2 maps) CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska (1983, 35p.) CR 83-24 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska (1985, 239p.) Walker, E.J. Morphology of the North Slope (1973, p.49-52) Walker, E.J. Walker, E.J. Walker, E.J. Suppression of ice fog from the Fort Wainwright, Alaska, cooling pond (1982, 34p.) Observations during BRIMFROST '83 (1984, 36p.) Walker, K.F. Let's consider land treatment, not land disposal (1976, p.60-62) Problems with rapid infiltration—a post mortem analysis (1984, 17p. + figs.) Walker, J.E.	Weeks, W.F. Salimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1023 MP 1039 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.85-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1639 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic lakes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 1284 Dynamics of near-shore ice (1976, p.13-171) MP 212 Sea ice conditions in the Arctic (1976, p.173-205) MP 918 Sea ice conditions in the Arctic (1976, p.173-205) MP 919 Dynamics of near-shore ice (1977, p.106-112) MP 919 Interesting festures of radar imagery of ice-covered North Slope lakes (1977, p.129-136) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) Bagineering properties of sea ice (1977, p.499-531) MP 1665 Studies of the movement of coastal sea ice near Prudhoe Bay,
MP 1510 Extraction of topography from side-looking satellite systems —a case study with SPOT simulation data [1983, p.535-550] MP 1695 Stop Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 199-] Unterstales, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] When, N.W. Land treatment systems and the environment [1979, p.201-225] Uthan, N.W. Land treatment systems and the environment [1979, p.201-225] When, N.W. Land treatment systems and the environment [1979, p.201-225] When, N.W. Land treatment systems and the environment [1979, p.201-225] When Cave, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Wan Cave, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Wan Berg, A. Hand-heid infrared systems for detecting roof moisture [1977, p.261-271] Van DeValk, W.A. Field investigation of St. Lawrence River hanging ice dams [1984, p.241-249] We Tilly MP 1830 Van Pelt, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, pp. + fgs.] Van Wyha, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Westigation of ice clogged channels in the St. Maryx River (1978, 73p.] Evaluation of ice deflectors on the USCG icebreaker Polar Star [1980, 37p.] Analysis of the performance of a 140-foot Great Lakes ice-breaker: USCGC Katmai Bay [1980, 28p.] Characteristics of ice in Whiteflah Bay and St. Maryx River during January, February and March 1979 [1980, 27p.] SR 38-32 Clearing ice-clogged shipping channels [1980, 13p.] CR 38-28	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments [1944, p.133-146] MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West [1985, 119p.] Walker, B.D. Tundra and analogous soils [1981, p.139-179] Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska [1977, 49p.] SR 77-17 Biffects of low ground pressure vehicle traffic on tundra at Lonely, Alaska [1978, 63p.] Effects of crude and diesel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sensitivity maps [1978, p.242-259] Geobtanical atlas of the Prudhoe Bay region, Alaska [1980, 69p.] Landsat-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska [1982, 59p. + 2 maps-tional Wildlife Refuge, Alaska [1983, 35p.) CR 82-37 Sensitivity of plant communities and soil flora to seawater spills, Prudhoe Bay, Alaska [1983, 35p.) CR 83-24 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska [1985, 239p.] Walker, E.E. Suppression of ice fog from the Fort Wainwright, Alaska, cooling pond [1982, 34p.) Observations during BRIMFROST '83 [1984, 36p.] SR 84-19 Walkes, A.T. Let's consider land treatment, not land disposal [1976, p.60-62] Problems with rapid infiltration—a post mortem analysis (1984, 17p. + figs.) MF 1944 Walks, J.E. Development of a simplified method for field monitoring of soil moisture [1978, p.40-44] Review of techniques for measuring soil moisture in situ (1980, 17p.) SR 80-31	Wesks, W.F. Salinity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1026 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.85-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 869 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1689 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-MP 869) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic lakes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 1284 Dynamics of near-shore ice (1976, p.173-205) MP 912 Sea ice conditions in the Arctic (1976, p.173-205) MP 922 Sea ice properties and geometry (1976, p.173-205) MP 923 Interesting features of radar imagery of ice-covered North Slope lakes (1977, p.129-136) Interesting features of radar imagery of ice-covered North Slope lakes (1977, p.129-136) MP 1063 Studies of the movement of coastal sea ice near Prudhoe Bay. Alsaka, U.S.A. (1977, p.533-546) MP 1065
MP 1516 Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data [1983, p.535-550] MP 1695 Integration of Landsat land cover data into the Saginaw River Basin geographic information system for hydrologic modeling [1984, 19p.] Unterstaker, N. Using sea ice to measure vertical heat flux in the ocean [1982, p.2071-2074] Urban, N.W. Land treatment systems and the environment [1979, p.201-225] MP 1414 Utt, M.E. Ice reoperties in a grounded man-made ice island [1986, p.135-142] Van Cleva, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Cleva, E. Revegetation in arctic and subarctic North America—a literature review [1976, 32p.] Van Develle, W.A. Field investigation of St. Lawrence River hanging ice dams MP 1390 Van Pett, D. Wetting of polystyrene and urethane roof insulations in the laboratory and on a protected membrane roof [1984, pp. + figs.] Van Wyha, G. Ice-cratering experiments Blair Lake, Alaska [1966, Various pagings) Vance, G.P. Investigation of ice clogged channels in the St. Marys River (1978, 73p.) Evaluation of ice deflectors on the USCG icebreaker Polar Star [1980, 37p.] Analysis of the performance of a 140-foot Great Lakes icebreaker: USCGC Katmai Bay [1980, 28p.] CR 29-32 Clearing ice-clogged shipping channels [1980, 13p.] Clearing ice-clogged shipping channels [1980, 13p.]	Marginal ice zones: a description of air-ice-ocean interactive processes, models and plasmed experiments (1984, p.133-146) MIZEX—a program for mesoscale sir-ice-ocean interaction experiments in Arctic marginal ice zones. 6: MIZEX-West (1985, 119p.) Walker, B.D. Tundra and analogous soils (1981, p.139-179) Walker, D.A. Effects of low-pressure wheeled vehicles on plant communities and soils at Prudhoe Bay, Alaska (1977, 49p.) SR 77-17 Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska (1978, 63p.) Effects of crude and diesel oil spill on plant communities at Prudehoe Bay, Alaska, and the derivation of oil spill sensitivity maps (1978, p.242-259) MP 1184 Geobotanical atles of the Prudhoe Bay region, Alaska (1980, 69p.) Landsat-assisted environmental mapping in the Arctic National Wildliffs Refuge, Alaska (1982, 35p. + 2 maps). CR 82-14 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska (1983, 35p.) CR 83-24 Vegetation and environmental gradients of the Prudhoe Bay region, Alaska (1985, 239p.) Walker, H.J. Morphology of the North Slope (1973, p.49-52) Walker, E.E. Suppression of ice fog from the Port Wainwright, Alaska, cooling pond (1982, 34p.) Observations during BRIMFROST '83 (1984, 36p.) SR 82-23 Observations with rapid infiltration—a post mortem analysis (1984, 17p. + figs.) MP 1944 Walks, J.E. Development of a simplified method for field monitoring of soil moisture (1978, p.40-44) Review of techniques for measuring soil moisture in situ	Weeks, W.F. Salimity variations in sea ice (1974, p.109-122) MP 1023 MP 1023 MP 1023 MP 1023 MP 1036 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971) (1974, p.119-138) Remote sensing program required for the AIDJEX model (1974, p.22-44) Ice dynamics in the Canadian Archipelago and adjacent Arctic basin as determined by ERTS-1 observations (1975, p.85-877) Remote sensing plan for the AIDJEX main experiment (1975, p.21-48) Messurement of sea ice drift far from shore using LANDSAT and aerial photographic imagery (1975, p.541-554) MP 849 Techniques for using LANDSAT imagery without references to study sea ice drift and deformation (1976, p.115-135) MP 1639 Thickness and roughness variations of arctic multiyear sea ice (1976, 25p.) Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery (1976, p.595-609) Dynamics of near-shore ice (1976, p.9-34) Imaging radar observations of frozen Arctic lakes (1976, p.169-175) Dynamics of near-shore ice (1976, p.267-275) MP 1284 Dynamics of near-shore ice (1976, p.132-171) MP 1290 Sea ice conditions in the Arctic (1976, p.173-205) MP 912 Sea ice conditions of rear-shore ice (1977, p.106-112) MP 918 Sea ice conditions of rear-shore ice (1977, p.106-112) MP 919 Interesting festures of radar imagery of ice-covered North Slope lakes (1977, p.129-136) Integrated approach to the remote sensing of floating ice (1977, p.445-487) Visual observations of floating ice from Skylab (1977, p.353-379) MP 1265 Studies of the movement of coastal sea ice near Prudhoe Bay,

Characterization of the surface roughness and floe geometry	Numerical simulation of ice gouge formation and infilling on	Rheological implications of the internal structure and crystal
of the sea ice over the continental shelves of the Beaufort	the shelf of the Beaufort Sea [1985, p.393-407]	fabrics of the West Antarctic ice sheet as revealed by deep
and Chukchi Seas (1977, p.32-41) MP 1163	MP 1904	core drilling at Byrd Station [1976, p.1665-1677] MIP 1382
Internal structure of fast ice near Narwahl Island, Beaufort Sea, Alaska (1977, 8p.) CR 77-29	Pressure ridge morphology and physical properties of sea ice in the Greenland Sea [1985, p.214-223] MP 1935	Wilson, E.L.
Dynamics of near-shore ice [1977, p.411-424]	Numerical simulation of sea ice induced gouges on the shelves	Ice dynamics in the Canadian Archipelago and adjacent Arc-
MP 1076	of the polar oceans [1985, p.259-265] MP 1938	tic basin as determined by ERTS-1 observations (1975,
Dynamics of near-shore ice [1977, p.503-510] MP 1200	Mechanical properties of multi-year sea ice. Phase 2: Test results [1985, 81p.] CR 85-16	p.853-877 ₁ MP 1885 Winiarski, M.E.
Some elements of iceberg technology [1978, p.45-98]	results [1985, 81p.] CR 85-16 Remote sensing of the Arctic sess [1986, p.59-64] MIP 2117	Topical databases: Cold Regions Technology on-line (1985,
MP 1616	MP 2117	p.12-15 ₁ MIP 2027
Some elements of iceberg technology [1978, 31p.]	Physical properties of the sea ice cover [1986, p.87-102]	Winters, W.J.
Preferred crystal orientations in the fast ice along the margins	MP 2047 Ice gouge hazard analysis [1986, p.57-66] MP 2106	Geotechnical properties and freeze/thaw consolidation behavior of sediment from the Beaufort Sea, Alaska [1985,
of the Arctic Ocean [1978, 24p.] CR 74-13	Weertman, J.	83p. ₁ MIP 2025
Ice arching and the drift of pack ice through channels [1978,	Influence of irregularities of the bed of an ice sheet on deposi-	Wolfe, S.H.
p.415-432 ₁ MP 1138 Dynamics of near-shore ice [1978, p.11-22 ₁ MP 1205	tion rate of till [1971, p.117-126] MP 1009	Analysis of explosively generated ground motions using Fourier techniques (1976, 86p.) CR 76-28
Measurement of mesoscale deformation of Beaufort sea ice	Can a water-filled crevasse reach the bottom surface of a glacier? (1973, p.139-145) MP 1044	Woods, P.F.
(AIDJEX-1971) [1978, p.148-172] MP 1179	Depth of water-filled crevasses that are closely spaced [1974,	Limnological investigations: Lake Koocanusa, Montans.
Problems of offshore oil drilling in the Beaufort Sea [1978, p.4-11] MP 1250	p.543-544 ₁ MP 1038	Part 4: Factors controlling primary productivity [1982, 106p.] SR 82-15
Dynamics of near-shore ice [1978, p.230-233]	Stability of Antarctic ice [1975, p.159] MP 1042	Workshop on Ice Penetration Technology, Hamover, NH,
MP 1619	Glaciology's grand unsolved problem (1976, p.284-286) MP 1056	June 12-13, 1964
Sea ice ridging over the Alaskan continental shelf [1979, 24p.; CR 79-06	Mechanical properties of polycrystalline ice: an assessment of	[Proceedings] (1984, 345p.) SR 84-33
24p. ₁ CR 79-08 Surface-based scatterometer results of Arctic sea ice [1979,	current knowledge and priorities for research [1979, 16p.]	Wortley, C.A.
p.78-85 ₁ MP 1260	MP 1207	Methods of ice control for winter navigation in inland waters [1984, p.329-337] MP 1831
"Pack ice and icebergs"—report to POAC 79 on problems of	Well, G. Extraction of topography from side-looking satellite systems	Wright, B.
the seasonal sea ice zone: an overview (1979, p.320-337) MP 1320	—a case study with SPOT simulation data [1983, p.535-	Multi year pressure ridges in the Canadian Beaufort Sea
Sea ice ridging over the Alaskan continental shelf [1979,	550 ₁ MP 1695	[1979, p.107-126] MIP 1229
p.4885-4897 ₁ MP 1240	Weinstein, A.L.	Multi-year pressure ridges in the Canadian Beaufort Sea [1981, p.125-145] MP 1514
The iceberg cometh [1979, p.66-75] MP 1305	Use of compressed air for supercooled fog dispersal (1976, p.1226-1231) MP 1614	Wright, B.D.
Crystal alignments in the fast ice of Arctic Alaska [1979, 21p.] CR 79-22	Weiser, J.R.	Sea ice pressure ridges in the Beaufort Sea [1978, p.249-
Dynamics of near-shore ice [1979, p.181-207]	Modeling hydrologic impacts of winter navigation [1981,	271 ₁ MP 1132
MP 1291	p.1073-1080j MP 1445 Wolse, H.V.	Wright, E.A. Thermal energy and the environment [1975, 3p. + 2p. figs.]
Crystal alignments in the fast ice of Arctic Alaska (1980, p.1137-1146) MP 1277	Vanadium and other elements in Greenland ice cores [1976,	MP 1480
International Workshop on the Seasonal Sea Ice Zone, Mon-	4p. ₃ CR 76-24	Pothole primer-a public administrator's guide to under-
terey, California, Peb. 26-Mar.1, 1979 [1980, 357p.]	Atmospheric trace metals and sulfate in the Greenland Ice	standing and managing the pothole problem [1981, 24p.] SR 81-21
MP 1292 Overview [International Workshop on the Seasonal Sea Ice	Sheet [1977, p.915-920] MP 949 Vanadium and other elements in Greenland ice cores [1977,	Sewage sludge aids revegetation [1982, p.198-301]
Zone ₂ (1980, p.1-35) MP 1293	p.98-102 ₁ MP 1092	MP 1735
Iceberg water: an assessment [1980, p.5-10] MP 1365	Wellen, E.W.	Land treatment research and development program: synthesis
Dynamics of near-shore ice [1981, p.125-135]	Sublimation and its control in the CRREL permafrost tunnel	of research results [1983, 144p.] CR 83-20 Frost action and its control [1984, 145p.] MP 1704
MP 1599 Ground-truth observations of ice-covered North Slope lakes	(1981, 12p.) SR 81-06 Weller, G.	Frost action and its control [1984, 145p.] MP 1704 Engineer's pothole repair guide [1984, 12p.] TD 84-01
images by radar [1981, 17p.] CR \$1-19	Abiotic overview [1971, p.173-181] MP 906	Wa, HC.
Sea ice: the potential of remote sensing [1981, p.39-48]	Computer simulation of the snowmelt and soil thermal regime	Investigation of ice forces on vertical structures [1974,
MP 1468 Physical and structural characteristics of sea ice in McMurdo	at Barrow, Alaska [1975, p.709-715] MP 857	153p. ₁ MP 1041
Sound [1981, p.94-95] MP 1542	Problems of offshore oil drilling in the Beaufort Sea (1978, p.4-11) MP 1250	Washben, J.L. Ice removal from the walls of navigation locks [1976, p.1487-
Growth, structure, and properties of sea ice [1982, 130p.]	Science program for an imaging radar receiving station in	1496 ₁ MP 888
M 82-01	Alaska [1983, 45p.] MIP 1884	Investigation of ice clogged channels in the St. Marys River
Physical and structural characteristics of antarctic sea ice [1982, p.113-117] MP 1548	Offshore oil in the Alaskan Arctic [1984, p.371-378]	[1978, 73p.] MP 1170
Equations for determining the gas and brine volumes in sea	MP 1743 Wellman, R.J.	Physical measurement of ice jams 1976-77 field season [1978, 19p.] SR 78-03
ice samples [1982, 11p.] CR 82-30	Comparative near-millimeter wave propagation properties of	Hydraulic model investigation of drifting snow [1978, 29p.]
Physical properties of the ice cover of the Greenland Sea [1982, 27p.] SR 82-28	snow or rain [1983, p.115-129] MP 1690	CR 78-16
Recent advances in understanding the structure, properties,	Attenuation and backscatter for snow and sleet at 96, 140, and 225 GHz (1984, p.41-52) MP 1864	Ice and navigation related sedimentation [1978, p.393-403] MP 1133
and behavior of sea ice in the coastal zones of the polar	225 GHz (1984, p.41-52) MP 1864 Worner, R.A.	Effect of vessel size on shoreline and shore structure damage
oceans [1983, p.25-41] MP 1604	Constraints and approaches in high latitude natural resource	along the Great Lakes connecting channels [1983, 62p.]
Equations for determining the gas and brine volumes in sea- ice samples (1983, p.306-316) MP 2055	sampling and research (1984, p.41-46) MP 2013	SR \$3-11
Statistical aspects of ice gouging on the Alaskan Shelf of the	Weyrick, P.B.	Shoreline erosion and shore structure damage on the St. Marys River (1983, 36p.) SR 83-15
Beaufort Sea (1983, 34p. + map) CR \$3-21	Nitrogen removal in cold regions trickling filter systems [1986, 39p.] SR 86-02	Rise pattern and velocity of frazil ice [1984, p.297-316]
Science program for an imaging radar receiving station in Alaska [1983, 45p.] MP 1884	Whillans, I.M.	MP 1816
Mechanical properties of ice in the Arctic seas [1984, p.235-	Ice flow leading to the deep core hole at Dye 3, Greenland	Data acquisition in USACRREL's flume facility [1985, p.1053-1058; MP 2089
259 ₁ MP 1674	[1984, p.185-190] MP 1824	Laboratory study of flow in an ice-covered sand bed channel
Summary of the strength and modulus of ice samples from multi-year pressure ridges (1984, p.126-133)	White, L. Mobility bibliography (1981, 313p.) SR 81-29	(1986, p.3-14) MP 2123
MP 1679	Wilhelt, T.T.	Waori, A.F.
Variation of ice strength within and between multiyear pres-	Results of the US contribution to the Joint US/USSR Bering	Mechanical properties of snow used as construction material [1975, p.157-164] MP 1057
sure ridges in the Beaufort Sea (1984, p.134-139) MP 1680	Sea Experiment (1974, 197p.) MP 1032	Foundations in permafrost and seasonal frost; Proceedings
Mechanical properties of multi-year sea ice. Phase 1: Test	Williams, I.M. Snow and ice [1975, p.435-441, 475-487] MP 844	[1985, 62p.] MIP 1730
results [1984, 105p.] CR 84-09	Willicockson, W.	Xirouchakis, P.C.
Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea [1984, p.213-236] MP 1838	Computer file for existing land application of wastewater sys-	Investigation of the acoustic emission and deformation response of finite ice plates [1981, 199.] CR 81-06
Offshore oil in the Alaskan Arctic (1984, p.371-378)	tems: a user's guide [1978, 24p.] SR 78-22	Investigation of the acoustic emission and deformation re-
MP 1743	Willey, W. Losses from the Fort Wainwright heat distribution system	sponse of finite ice plates [1981, p.123-133]
Mechanical properties of sea ice: a status report [1984, p.135-198] MP 1808	[1981, 29p.] SR 81-14	MP 1436 On the acoustic emission and deformation response of finite
Sea ice properties (1984, p.82-83) MP 2136	Williams, R.M.	ice plates (1981, p.385-394) MP 1455
Sea ice characteristics and ice penetration probabilities in the	Turbulent heat flux from Arctic leads [1979, p.57-91]	Preliminary investigation of the acoustic emission and defor-
Arctic Ocean [1984, p.37-65] MP 1993	MP 1340 Observations of condensate profiles over Arctic leads with a	mation response of finite ice plates [1982, p.129-139] MP 1589
Modeling of Arctic sea ice characteristics relevant to naval operations (1984, p.67-91) MP 1994	hot-film anemometer [1981, p.437-460] MP 1479	X1, X.
Summary of the strength and modulus of ice samples from	Williams, R.R.	Water migration in unsaturated frozen morin clay under lin-
multi-year pressure ridges (1985, p.93-98) MP 1848	Explosive obscuration sub-test results at the SNOW-TWO	ear temperature gradients [1985, p.111-122]
Preliminary simulation study of sea ice induced gouges in the sea floor (1985, p.126-135) MP 1917	field experiment (1984, p.347-354) MP 1872 Williamson, T.	MP 1934 Experimental study on factors affecting water migration in
Variation of ice strength within and between multiyear pres-	Gas inclusions in the Antarctic ice sheet and their glaciologi-	frozen morin clay [1985, p.123-128] MP 1897
sure ridges in the Beaufort Sea [1985, p.167-172]	cal significance (1975, p.5101-5108) MP \$47	Prediction of unfrozen water contents in frozen soils by a two-
MP 2121 Physical properties of sea ice in the Greenland Sea [1985,	Rheological implications of the internal structure and crystal fabrics of the West Antarctic ice sheet as revealed by deep	point or one-point method [1985, p.83-87] MP 1929 Noil-water potential and unfrozen water content and tempera-
p.177-188 ₁ MP 1903	core drilling at Byrd Station [1976, 25p.] CR 76-35	. vre [1985, p.1-14] MP 1932

Wasan Park	
Yapa, P.D. Computer simulation of ice cover formation in the Upper St.	Zheng, X. Bibliography of literature on China's glaciers and permafrost.
Lawrence River [1984, p.227-245] MP 1814 Biffect of ice cover on hydropower production [1984, p.231-	Part 1: 1938-1979 [1982, 44p.] SR 82-20 Zha, Y.
234 ₁ MP 1876 Unified degree-day method for river ice cover thickness simulation [1985, p.54-62 ₁ MP 2065	Relationship between the ice and unfrozen water phases in frozen soils as determined by pulsed nuclear resonance and physical desorption data [1983, p.37-46] MP 1632
Yes, YC. IMPACT OF SPHERES ON ICE. CLOSURE (1972,	Creep behavior of frozen silt under constant uniaxial stress [1983, p.1507-1512]. MP 1805
p.473 ₁ MP 988 Approximate analysis of melting and freezing of a drill hole through an ice shelf in Antarctica [1975, p.421-432] MP 861	Creep behavior of frozen silt under constant uniaxial stress [1984, p.33-48] MP 1807 Uniaxial compressive strength of frozen silt under constant deformation rates [1984, p.3-15] MP 1773
Heat transfer characteristics of melting and refreezing a drill hole through an ice shelf in Antarctics [1976, 15p.] CR 76-12	Rifects of soluble saits on the unfrozen water contents of the Lanzhou, P.R.C., siit [1984, 18p.] CR 84-16 Effects of soluble saits on the unfrozen water contents of the
Heat transfer between a free water jet and an ice block held normal to it 1976, p.299-307, MP 882 Heat transfer over a vertical melting plate [1977, 12p.; CR 77-32	Lanzhou, PRC, silt [1985, p.99-109] MIP 1933 Strain rate effect on the tensile strength of frozen silt [1985, p.153-157] MIP 1898
CR 77-32 Free convection heat transfer characteristics in a melt water	Tensile strength of frozen silt [1986, p.15-28] MP 1971 Ziesen, J.R.
layer [1980, p.550-556] MP 1311 Review of thermal properties of snow, ice and sea ice [1981, 27p.] CR 81-10	Experimental determination of heat transfer coefficients in water flowing over a horizontal ice sheet (1986, 81p.) CR 86-03
On the temperature distribution in an air-ventilated mow layer [1982, 10p.] CR 82-05	Zomerman, I. Prost heave of full-depth asphalt concrete pavements [1985]
Second National Chinese Conference on Permafrost, Lanzhou, China, 12-18 October 1981 [1982, 58p.] SR 82-03	p.66-76 ₁ MP 1927 Survey of airport pavement distress in cold regions [1986, p.41-50 ₁ MP 2002
Aerosol growth in a cold environment [1984, 21p.] CR 84-06	Zotikov, I.A. Sea ice on bottom of Ross Ice Shelf [1979, p.65-66]
Temperature structure and interface morphology in a melting ice-water system [1984, p.305-325] MP 1727	MP 1336 Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337
Experimental determination of heat transfer coefficients in water flowing over a horizontal ice sheet [1986, 81p.] CR 86-03	Antifreeze-thermodrilling for core through the central part of the Ross Ice Shelf (J-9 Camp), Antarctica [1979, 12p.] CR 79-24
Yekots, R. Ice removal from the walls of navigation locks (1976, p.1487-	Structure of ice in the central part of the Ross Ice Shelf, Antarctica (1985, p.39-44) MP 2110
1496 ₁ MP 888 Ice releasing block-copolymer coatings [1978, p.544-551] MP 1141	Zufelt, J. Survey of ice problem areas in navigable waterways 1985,
Yong, R.N. Proceedings of a workshop on the properties of snow, 8-10	32p. ₁ SR 85-02 Zufelt, J.E.
April 1981, Snowbird, Utah [1982, 135p.] SR 82-18 Proceedings of the ISTVS Workshop on Measurement and Evaluation of Tire Performance under Winter Conditions,	Upper Delaware River ice control—a case study (1986, p.760-770) NP 2005 Potential solution to ice jam flooding: Salmon River, Idaho [1986, p.15-25] MP 2131
Alta, Utah, 11-14, April 1983 [1985, 177p.] SR 85-15 Need for snow tire characterization and evaluation [1985,	
p.1-2 ₃ MP 2043 Young, S.A.	
Effects of phase III construction of the Chena Flood Control Project on the Tanana River near Pairbanks, Alaska—a preliminary analysis [1984, 11p. + figs.] MP 1745	
Zabilansky, L.J. Ice forces on model structures [1975, p.400-407]	
MP 863 Ice forces on simulated structures (1975, p.387-396)	
Ice engineering facility [1983, 12p. + fig.] MP 2088	
Review of experimental studies of uplifting forces exerted by adfrozen ice on marina piles [1985, p.529-542] MP 1905	
Real-time measurements of uplifting ice forces [1985, p.253-259] MP 2092	
Cazenovia Creek Model data acquisition system [1985, p.1424-1429] MP 2090	
Data acquisition in USACRREL's flume facility [1985, p.1053-1058] MP 2089	
Instrumentation for an uplifting ice force model [1985, p.1430-1435] MIP 2091 Zagorodnov, V.S.	
Sea ice on bottom of Ross Ice Shelf [1979, p.65-66] MP 1336	
Core drilling through Ross Ice Shelf (1979, p.63-64) MP 1337	
Zarling, J. Yukon River breakup 1976 (1977, p.592-596) MIP 960	
Ice force measurement on the Yukon River bridge 1981, p.749-777 ₁ MP 1396	
Zarling, J.P. Heat and mass transfer from freely falling drops at low tem-	
perstures [1980, 14p.] CR 80-18 Single and double reaction beam load cells for measuring ice	
forces (1980, 17p.) CR 20-25 Performance of a thermosyphon with an inclined evaporator	
and vertical condenser [1984, p.64-68] MP 1677	
Laboratory tests and analysis of thermosyphons with inclined evaporator sections [1985, p.31-37] MP 1853	
Heat transfer characteristics of thermosyphons with inclined evaporator sections [1986, p.285-292] MP 2034 Zeller, E.J.	
Planetary and extraplanetary event records in polar ice cape (1980, p.18-27) MP 1461	
Nitrogenous chemical composition of anteretic ice and snow [1981, p.79-81] MP 1541	
Nitrate fi ctuations in antarctic snow and firm potential	
sources and mechanisms of formation (1982, p.243-248) MP 1551	

Ablatica	Acrial surveys	Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska. Abele, G., et al, [1977, 32p.]
Ablation seasons of arctic and antarctic sea ice. Andreas, B.L., et al, g1982, p.440-447; MP 1517	Correlation and quantification of airborne spectrometer data to turbidity measurements at Lake Powell, Utah. Merry,	SR 77-31
On the differences in ablation sessons of Arctic and Antarctic	C.J., [1970, p.1309-1316] MP 1271	Long-term effects of off-road vehicle traffic on tundra terrain.
see ice. Andress, E.L., et al, [1982, 9p.] CR 82-33	Applications of remote sensing in New England. McKim, H.L., et al., [1975, 8p. + 14 figs. and tables] MP 913	Abele, G., et al, (1984, p.283-294; MIP 1828 Abromitralement
Energy exchange over antarctic sea ice in the spring. Andreas, E.L., et al, [1985, p.7199-7212] MP 1889	Remote measurement of sea ice drift. Hibler, W.D., III, et	Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al,
Absorption	al, [1975, p.541-554] MP 849	[1975, p.5101-5108 ₂ MP 847
Water absorption of insulation in protected membrane roofing systems. Schaefer, D., [1976, 15p.] CR 76-38	Land use and water quality relationships, eastern Wisconsin. Haugen, R.K., et al, [1976, 47p.] CR 76-30	Soft drink bubbles. Cragin, J.H., [1983, p.71] MIP 1736
systems. Schaefer, D., [1976, 15p.] CR 76-38 Absorptivity	Skylab imagery: Application to reservoir management in New	Air flow
Light-colored surfaces reduce thaw penetration in permafrost.	England. McKim, H.L., et al, [1976, 51p.]	Water and air horizontal flow in porous media. Nakano, Y.,
Berg, R.L., et al, [1977, p.86-99] MP 954	Applications of remote sensing in the Boston Urban Studies	[1980, p.81-85] MP 1341 Water and air vertical flow through porous media. Nakano,
Effects of moisture and freeze-thaw on rigid thermal insulations. Kaplar, C.W., [1978, p.403-417] MIP 1005	Program, Parts I and II. Merry, C.J., et al, [1977, 36p.]	Y., [1980, p.124-133] MIP 1342
Acoustic measurement	CR 77-13	Traveling wave solution to the problem of simultaneous flow
Rheology of ice. Fish, A.M., [1978, 196p.] MP 1988	Investigation of an airborne resistivity survey conducted at very low frequency. Arcone, S.A., [1977, 48p.]	of water and air through homogeneous porous media. Nakano, Y., (1981, p.57-64) MIP 1419
Acoustic emission response in polycrystalline materials. St. Lawrence, W.F., (1979, p.223-228; MP 1246	CB. 77-29	Air pollution
Acoustic emission and deformation response of finite ice	Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 38p.] SR 77-28	Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] MP 1395
plates. Xirouchakis, P.C., et al, [1981, p.123-133]	Aerial photointerpretation of a small ice jam. DenHartog,	Atmospheric pollutants in snow cover runoff. Colbeck, S.C.,
MP 1436 Acoustic measuring instruments	S.L., (1977, 17p.) SR 77-32	(1981, p.1-10) MP 1586
Some characteristics of grounded floebergs near Prudhoe Bay,	Aerial photography of Cape Cod shoreline changes. Gatto, L.W., £1978, 49p.1 CR 78-17	Atmospheric pollutants in snow cover runoff. Colbeck, S.C., p1981, p.1383-1388; MP 1487
Alaska. Kovacs, A., et al, (1976, p.169-172)	Estuarine processes and intertidal habitats in Grays Harbor,	[1981, p. 138.5-1388] Engine starters in winter. Coutta, H.J., [1981, 379.] SR 81-32
MP 1118 Grounded floebergs near Prudhoe Bay, Alaska. Kovacs, A.,	Washington: a demonstration of remote sensing techniques.	
et al, [1976, 10p.] CR 76-34	Gatto, L.W., [1978, 79p.] CR 78-18 VLP airborne resistivity survey in Maine. Arcone, S.A.,	Chemical obscurant tests during winter; environmental fate. Cragin, J.H., [1982, 9p.] SR 82-19
Acoustic scattering	(1978, p.1399-1417) MP 1166	Low temperature automotive emissions. Coutts, H.J.,
Laboratory studies of acoustic scattering from the underside	Measurement of mesoscale deformation of Beaufort sea ice	(1983, 2 vols.) MCP 1783
of see ice. Jezek, K.C., et al, [1985, p.87-91] MP 1912	(AIDJEX-1971). Hibler, W.D., III, et al, [1978, p.148-172] MP 1179	Catalog of amoke/obscurant characterization instruments. O'Brien, H.W., et al, [1984, p.77-82] MP 1865
Acoustics	Mapping of the LANDSAT imagery of the Upper Susitna	Air temperature
International Workshop on the Sessonal Sea Ice Zone, Mon- terey, California, Feb. 26-Mar.1, 1979. Andersen, B.G.,	River. Gatto, L.W., et al. [1980, 41p.] CR 88-04	Selected climatic and soil thermal characteristics of the
ed, [1980, 357p.] MP 1292	Potential of remote sensing in the Corps of Engineers dredg- ing program. McKim, H.L., et al., (1985, 42p.)	Prudhoe Bay region. Brown, J., et al, (1975, p.3-12) MP 1954
Acoustic emissions during creep of frozen soils. Fish, A.M.,	SR 85-20	Surface temperature data for Atkasook, Alaska summer 1975.
ot al, [1982, p.194-206] MP 1495 Active layer	Aerosols	Haugen, R.K., et al., [1976, 25p.] SE 76-01 20-yr oscillation in eastern North American temperature re-
Permafrost and active layer on a northern Alaskan road.	Propane dispenser for cold for dissipation system. Hicks, J.R., et al, [1973, 38p.] MP 1033	cords. Mock, S.J., et al, [1976, p.484-486] MP 889
Berg, R.L., et al, [1978, p.615-621] MP 1102	Aerosols in Greenland snow and ice. Kumai, M., [1977,	Compressive and shear strengths of fragmented ice covers.
Human-induced thermokarst at old drill sites in northern Alaska. Lawson, D.E., et al, [1978, p.16-23]	p.341-350; MP 1725	Cheng, S.T., et al, [1977, 82p.] MP 951 Midwinter temperature regime and snow occurrence in Ger-
MP 1254	Elemental analyses of ice crystal nuclei and aerosols. Kumai, M., [1977, 5p.] MP 1191	many. Bilello, M.A., et al, [1978, 56p.] CR 78-21
Geophysics in the study of permafrost. Scott, W.J., et al.	Measurement and identification of acrosols collected near	Maximum thickness and subsequent decay of lake, river and
(1979, p.93-115) MP 1266 Neumann solution applied to soil systems. Lunardini, V.J.,	Barrow, Alaska. Kumai, M., [1978, 6p.] CR 78-20	fast sea ice in Canada and Alaska. Bilello, M.A., [1980, 160p.]
[1980, 7p.] CR 80-22	Microbiological aerosols during wastewater irrigation. Bausum, H.T., et al, [1978, p.273-280] MP 1154	Summer air temperature and precipitation in northern Alaska.
Dielectric properties of thawed active layers. Arcone, S.A.,	Health aspects of water reuse in California. Reed, S.C.,	Haugen, R.K., et al., (1980, p.403-412) MP 1439 Sea-ice atmosphere interactions in the Woddell Sea using
et al, (1982, p.618-626) MP 1547 Long-term active layer effects of crude oil spilled in interior	[1979, p.434-435] MP 1404	drifting buoys. Ackley, S.F., r1981, p.177-1911
Alaska. Collins, C.M., [1983, p.175-179] MP 1656	Bacterial acrosols resulting from wastewater irrigation in Ohio. Bausum, H.T., et al, [1979, 64p.] SR 79-32	MP 1427
Recovery and active layer changes following a tundra fire in	Chemical obscurant tests during winter; environmental fate.	Climate of remote areas in north-central Alaska: 1975-1979 summary. Haugen, R.K., [1982, 110p.] CR 82-35
northwestern Alaska. Johnson, L., et al, [1983, p.543- 547] MP 1660	Cragin, J.H., [1982, 9p.] SR 82-19 Microbiological aerosols from waste water. Bausum, H.T., et	Surface meteorology US/USSR Weddell Polynya Expedition,
Potential responses of permafrost to climatic warming.	al, [1983, p.65-75] MP 1578	1981. Andress, B.L., et al., [1983, 32p.] SR \$3-14 Relationships between estimated mean annual air and perma-
Goodwin, C.W., et al, [1984, p.92-105] MP 1716 Permafrost, snow cover and vegetation in the USSR. Bigl,	Chemical obscurant tests during winter: Environmental fate.	frost temperatures in North-Central Alaska. Haugen,
S.R., [1984, 128p.] SR 84-36	Cragin, J.H., [1983, p.267-272] MP 1760 Aerosol growth in a cold environment. Yen, YC., [1984,	R.K., et al., (1983, p.462-467) MP 1658
Adhesive strength	21p.; CR 84-96	Air water interactions Problems of the seasonal sea ice zone. Weeks, W.P., (1980,
Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-11	Catalog of smoke/obscurant characterization instruments.	p.1-35 ₁ MP 1293
Admixtures	O'Brien, H.W., et al, [1984, p.77-82] MP 1865 Acidity of snow and its reduction by alkaline serosols.	Airborne equipment
Grouting of soils in cold environments: a literature search.	Kumai, M., [1985, p.92-94] MP 2000	Airborne E-phase resistivity surveys of permafrost. Sell- mann, P.V., et al, [1974, p.67-71] MP 1944
Johnson, R., [1977, 49p.] SR 77-42 Advertises	Agriculture	Remote sensing plan for the AIDJEX main experiment.
Water vapor adsorption by sodium montmorillonite at -5C.	Symposium on land treatment of wastewater, CRREL, Aug. 1978, 1978, 2 vols.; MP 1145	Weeks, W.F., et al, [1975, p.21-48] MLP 862
Anderson, D.M., et al, (1978, p.638-644) MP 981	Energy and costs for agricultural reuse of wastewater. Slet-	Airborne roof moisture surveys. Tobiasson, W., [1986, p.45-47] MP 2139
Analysis of water in the Martian regolith. Anderson, D.M., et al, [1979, p.33-38] MP 1469	ten, R.S., et al, [1980, p.339-346] MP 1401	Airborne reder
Adsorption force theory of frost heaving. Takagi, S., [1980,	Air cushion vehicles Some effects of air cushion vehicle operations on deep snow.	Investigation of an airborne resistivity survey conducted at very low frequency. Arcone, S.A., [1977, 48p.]
p.57-81 ₁ MP 1334	Abels, G., et al. (1972, p.214-241) MIP 887	CIR 77-20
Summary of the adsorption force theory of frost heaving. Takagi, S., (1980, p.233-236) MIP 1332	Height variation along sea ice pressure ridges. Hibler, W.D., III. et al. r1975, p.191-199; MP 848	Detection of moisture in construction materials. Morey, R.M., et al, [1977, 9p.] CR 77-25
Aerial photographs	III, et al, [1975, p.191-199] MP 848 Arctic environment and the Arctic surface effect vehicle.	R.M., et al. (1977, 9p.) CR 77-25 Injet current measured with Seasat-1 synthetic aperture radar.
Meso-scale strain measurements on the Beaufourt see pack	Sterrett, K.F., [1976, 28p.] CR 76-01	Shemdin, O.H., et al., [1980, p.35-37] MP 1481
ice (AIDJEX 1971). Hibler, W.D., III, et al. [1974, p.119-138] MP 1035	Effects of hovercraft, wheeled and tracked vehicle traffic on tundra. Abele. G., r1976, p.186-215, MP 1123	Ricctromagnetic subsurface measurements. Dean, A.M., Jr., 1981, 19p.; SR 81-23
Remote sensing program required for the AIDJEX model.	tundra. Abele, G., [1976, p.186-215] MP 1123 Byalustion of an air cushion vehicle in Northern Alaska.	[1981, 19p.] SIR #1-23 Aircraft icing
Weeks, W.F., et al, [1974, p.22-44] MP 1040	Abele, G., et al, [1976, 7p.] MP 894	Interaction of a surface wave with a dielectric slab discon-
Aerial photography Seasonal regime and hydrological significance of stream ic-	Air-cushion vehicle effects on surfaces of Alaska's Arctic Slopes. Slaughter, C.W., [1976, p.272-279]	tinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-66
ings in central Alaska. Kane, D.L., et al, [1973, p.528-	Slopes. Sinughter, C.W., [1976, p.272-279] MP 1384	Potential icing of the space abuttle external tank. Perrick M.G., et al, [1982, 305p.] CR 82-25
540 ₁ MP 1026	Hovercraft ground contact directional control devices.	Computer modeling of time-dependent rime icing in the at-
Land use/vegetation mapping in reservoir management. Cooper, S., et al, (1974, 30p.) MP 1839	Abele, G., [1976, p.51-59] MP 875 Air cushion vehicle ground contact directional control de-	mosphere. Lozówski, R.P., et al, [1983, 74p.]
Aerial recommanded	vices. Abele, G., et al., [1976, 15p.] CR 76-45	Studies of high-speed rotor icing under natural conditions
Meso-scale strain measurements on the Beaufourt sea pack	Arctic transportation: operational and environmental evalua-	Itagaki, K., et al., [1983, p.117-123] MP 1635
ice (AIDJEX 1971). Hibler, W.D., III, et al., 1974,	tion of an air cushion vehicle in northern Alaska. Abele,	Self-shedding of accreted ice from high-speed rotors. Itags

Aircraft icing (cont.)	Amethografues	East Autorotice
Current procedures for forecasting aviation icing. Tucker, W.B., [1983, 31p.]	Calibrating cytindrical hot-film anemometer sensors. Andreas, E.L., et al, [1986, p.283-298] MP 1860	Nitrate fluctuations in antarctic snow and firm. Parker, B.C., et al, (1982, p.243-248) P 1551
Ice accretion under natural and laboratory conditions. Itaga-	Animals	-Polger, Cape
ki, K., et al. (1985, p.225-228) MFP 2609 Aircraft leading areas	Beological investigations of the tundra biome in the Prudhoe Bey Region, Alaska. Brown, J., ed, [1975, 215p.] MP 1053	Internal properties of the ice sheet at Cape Folger by radio echo sounding. Keliher, T.E., et al, [1978, 12p.]
Propane dispenser for cold fog dissipation system. Hicks,		CR 78-64
J.R., et al, [1973, 38p.] MP 1833 Runway site survey, Pensacola Mountains, Antarctica.	Influence of grazing on Arctic tundra ecosystems. Batzii, G.O., et al, [1976, p.153-160] MP 970	Ice short internal reflections. Ackley, S.F., et al, (1979, p.5675-5680) MP 1319
Kovacs, A., et al, [1977, 45p.] SR 77-14	Arctic ecosystem: the coestal tundra at Barrow, Alaska.	-Little America Station
Storm drainage design considerations in cold regions. Lobacz, E.F., et al, [1978, p.474-489] MP 1008	Brown, J., ed, (1980, 571p.) MP 1355 Point Barrow, Alaska, USA. Brown, J., (1981, p.775-776)	Ultrasonic investigation on ice cores from Antarctica. Kohnen, H., et al., (1979, 16p.) CR 79-10
Design considerations for airfields in NPRA. Crory, F.E., et	MP 1434	Ultrasonic investigation on ice cores from Antarctica.
al, [1978, p.441-458] MP 1006 Construction of temporary airfields in NPRA. Crory, F.E.,	Anisotropy Internal structure and crystal fabrics of the West Antarctic ice	Kohnen, H., et al, [1979, p.4865-4874] MP 1239 Marie Byrd Land
(1978, p.13-15) MP 1253	sheet. Gow, A.J., et al, [1976, 25p.] CR 76-35	Surface-wave dispersion in Byrd Land. Acharya, H.K.,
Airplanes Report on ice fall from clear sky in Georgia October 26, 1959.	Radar anisotropy of sea ice. Kovaca, A., et al, [1978, p.171-201] MP 1111	[1972, p.955-959] MP 992 Byrd Land quaternary volcanism. LeMasurier, W.E.,
Harrison, L.P., et al. (1960, 31p. plus photographs)	Radar anisotropy of sea ice. Kovaca, A., et al., 1978,	[1972, p.139-141] MP 994
MP 1017 Operation of the CRREL prototype air transportable shelter.	p.6037-6046 _j MP 1139 Ultrasonic investigation on ice cores from Antarctica.	-McMardo Ice Shelf Dielectric constant and reflection coefficient of snow surface
Flanders, S.N., [1980, 73p.] SR 80-10	Kohnen, H., et al, [1979, 16p.] CR 79-10	layers in the McMurdo Ice Shelf. Kovacs, A., et al, (1977,
Airports The strength of natural and processed snow. Abele, G.,	Ultrasonic investigation on ice cores from Antsrctica. Kohnen, H., et al. 1979, p.4865-4874 MP 1239	p.137-138 ₃ MP 1911 Subsurface measurements of the Ross Ice Shelf, McMurdo
[1975, p.176-186] MIP 1658	Anisotropic properties of sea ice. Kovaca, A., et al., 1979, p.5749-5759; MP 1258	Sound, Antarctica. Kovaca, A., et al, [1977, p.146-148] MP 1013
Design of airfield pavements for sessonal frost and permafrost conditions. Berg, R.L., et al, [1978, 18p.] MP 1189	p.5749-5759; MP 1258 Anisotropic properties of sea ice in the 50-150 MHz range.	Brine zone in the McMurdo loe Shelf, Antarctica. Kovaca,
Snow and ice roads in the Arctic. Johnson, P.R., (1979,	Kovacs, A., et al, [1979, p.324-353] MP 1620	A., et al, [1982, p.166-171] MP 1530 McMurdo Ice Shelf brine zone. Kovaca, A., et al, [1982,
p.1063-1071 ₁ MP 1223 Snow and ice control on railroads, highways and airports.	Modeling of anisotropic electromagnetic reflection from sea ice. Golden, K.M., et al, [1980, p.247-294]	28p. ₁ CR 82-39
Minsk, L.D., et al, [1981, p.671-706] MIP 1447	MP 1325 Physical properties of sea ice and under-ice current orienta-	-McMurde Seand leeberg thickness and crack detection. Kovaca, A., £1978,
Drainage facilities of airfields and heliports in cold regions. Lobacz, E.F., et al, [1981, 56p.] SR 81-22	tion. Kovaca, A., et al., [1980, p.109-153] MP 1323	p.131-145; NEP 1128
Survey of airport pavement distress in cold regions. Vinson, T.S., et al. (1986, p.41-50) MP 2002	Polarization studies in ses ice. Arcone, S.A., et al., (1980, p.225-245) MP 1324	Axial double point-load tests on snow and ice. Kovacs, A., [1978, 11p.] CR 78-01
T.S., et al, [1986, p.41-50] MIP 2002 Albedo	See ice anisotropy, electromagnetic properties and strength.	Subsurface measurements of McMurdo Ice Shelf. Gow,
Meteorological variation of atmospheric optical properties in	Kovacs, A., et al, [1980, 18p.] CR 88-28 Modeling of anisotropic electromagnetic reflection from sea	A.J., et al. (1979, p.79-80) MP 1338 Physical and structural characteristics of sea ice in McMurdo
an antarctic storm. Egan, W.G., et al, [1986, p.1155- 1165] MP 2099	ice. Golden, K.M., et al, [1980, 15p.] CR 80-23	Sound. Gow, A.J., et al, [1981, p.94-95] MP 1542
Algae	Modeling of anisotropic electromagnetic reflections from sea ice. Golden, K.M., et al, [1981, p.8107-8116]	Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al, (1983, 16p.) CR 83-06
Sea ice and ice algae relationships in the Weddell Sea. Ackley, S.F., et al, (1978, p.70-71) MP 1203	MP 1469	Physical mechanism for establishing algal populations in frazil
Standing crop of algae in the sea ice of the Weddell Sea region. Ackley, S.F., et al., 1979, p.269-281; MP 1242	Shear strength anisotropy in frozen saline and freshwater soils. Chamberlain, E.J., (1985, p.189-194)	ice. Garrison, D.L., et al, [1983, p.363-365] MP 1717
Ackley, S.F., et al, [1979, p.269-281] MP 1242 Physical, chemical and biological properties of winter sea ice	MP 1931	Sea ice microbial communities in Antarctica. Garrison,
in the Weddell Sea. Clarke, D.B., et al, [1982, p.107- 109] MP 1609	Antarctica Review of sea-ice weather relationships in the Southern Hem-	D.L., et al, (1986, p.243-250) MP 2026Pensacola Mountains
Physical mechanism for establishing algal populations in frazil	isphere. Ackley, S.F., [1981, p.127-159] MP 1426	Runway site survey, Pensacola Mountains, Antarctica.
ice. Garrison, D.L., et al, [1983, p.363-365] MP 1717	Boom for shipboard deployment of meteorological instru- ments. Andreas, B.L., et al, [1983, 14p.] SR 83-28	Kovaca, A., et al, [1977, 45p.] SR 77-14 —Ress Ice Shelf
Relative abundance of diatoms in Weddell Sea pack ice.	Simple boom for use in measuring meteorological data from	Stability of Antarctic ice. Weertman, J., [1975, p.159]
Clarke, D.B., et al, [1983, p.181-182] MP 1786 Morphology and ecology of diatoms in sea ice from the Wed-	a ship. Andress, E.L., et al, [1984, p.227-237] MP 1752	MP 1042 Stable isotope profile through the Ross Ice Shelf at Little
dell Sea. Clarke, D.B., et al, [1984, 41p.] CR 84-05	-Allen Hills	America V, Antarctica. Danagaard, W., et al, [1977,
Sea ice and biological activity in the Antarctic. Clarke, D.B., et al, [1984, p.2087-2095] MIP 1701	Radio echo sounding in the Allan Hills, Antarctica. Kovacs, A., [1980, 9p.] SR 80-23	p.322-325 ₁ MP 1095 Ross Ice Shelf Project drilling, October-December 1976.
All terrain vehicles	Assundan-Scott Station Nitrogenous chemical composition of antarctic ice and snow.	Rand, J.H., (1977, p.150-152) MP 1061
Ecological and environmental consequences of off-road traf- fic in northern regions. Brown, J., (1976, p.40-53)	Parker, B.C., et al, [1981, p.79-81] MP 1541	Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al., [1978, p.7-36] MP 1075
MP 1383	South Pole ice core drilling, 1981-1982. Kuivinen, K.C., et al, {1982, p.89-91} MP 1621	Core drilling through Ross Ice Shelf. Zotikov, I.A., et al., [1979, p.63-64] MP 1337
Hovercraft ground contact directional control devices. Abele, G., [1976, p.51-59] MP 875	Baseline acidity of ancient precipitation from the South Pole.	Ross Ice Shelf bottom ice structure. Zotikov, I.A., et al,
Vehicle damage to tundra soil and vegetation. Walker, D.A., et al. (1977, 490.)	Cragin, J.H., et al, [1984, 7p.] CR 84-15 Meteorological variation of atmospheric optical properties in	(1979, p.65-66) MP 1336 Radar detection of sea ice and current alinement under the
et al, (1977, 49p.) SR 77-17 Ecological impact of vehicle traffic on tundra. Abele, G.,	an antarctic storm. Egan, W.G., et al, [1986, p.1155-	Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-97]
[1981, p.11-37] MP 1463	1165 ₂ MP 2099Amundson Sea	MP 1543 Effects of conductivity on high-resolution impulse radar
Alpine landscapes Terrain analysis from space shuttle photographs of Tibet.	West antarctic sea ice. Ackley, S.F., (1984, p.88-95)	sounding. Morey, R.M., et al., 1982, 12p.;
Kreig, R.A., et al, [1986, p.400-409] MP 2097	MP 1818Beacon Valley	CR 82-42 Changes in the Ross Ice Shelf dynamic condition. Jezek,
Alpine tundra Climatic and dendroclimatic indices in the discontinuous per-	Examining antarctic soils with a scanning electron micro-	K.C., [1984, p.409-416] MP 2058
mafrost zone of the Central Alaskan Uplands. Haugen, R.K., et al, [1978, p.392-398] MP 1099	scope. Kumai, M., et al, (1976, p.249-252) MP 931 —Byrd Station	Modified theory of bottom crevasses. Jezek, K.C., 1984, p.1925-1931
Analysis (mathematics)	Oxygen isotope profiles through ice sheets. Johnsen, S.J., et	Mass balance of a portion of the Ross Ice Shelf. Jezek, K.C., et al, (1984, p.381-384) MP 1919
Buckling pressure of an elastic floating plate. Takegi, S., [1978, 49p.] CR 78-14	al, 1972, p.429-4341 MP 997 Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al.	Rheology of glacier ice. Jezek, K.C., et al, [1985, p.1335-
Evaluation of the moving boundary theory. Nakano, Y.,	[1975, p.5101-5108] MÍP 847	1337; MP 1844 —Ross See
(1978, p.142-151) MP 1147 Some Bessel function identities arising in ice mechanics prob-	Resurvey of the "Byrd" Station, Antarctica, drill hole. Gar- field, D.E., et al., [1976, p.29-34] MP 846	Surface roughness of Ross Sea pack ice. Govoni, J.W., et al,
lems. Takagi, S., [1979, 13p.] CR 79-27	Internal structure and crystal fabrics of the West Antarctic ice sheet. Gow, A.J., et al, [1976, 25p.] CR 76-35	[1983, p. 123-124] MP 1764 West antarctic sea ics. Ackley, S.P., [1984, p.88-95]
Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al, [1980, p.263-272]	Crystal fabrics of Weat Antarctic ice sheet. Gow, A.J., et al,	MP 1818
MP 1391	[1976, p.1665-1677] MP 1382	-Siple Coast Changes in the Ross Ice Shelf dynamic condition. Jezek,
Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] MP 1342	Ultrasonic measurements on deep ice cores from Antarctica. Gow, A.J., et al. [1978, p.48-50] MP 1282	K.C., (1984, p.409-416) MP 2050
One-dimensional transport from a highly concentrated, transfer type source. O'Neill, K., [1982, p.27-36]	Ultrasonic investigation on ice cores from Antarctica. Kohnen, H., et al., [1979, 16p.] CR 79-10	South Pole Composition and structure of South Pole snow crystals.
MP 1489	Ultrasonic investigation on ice cores from Antarctica.	Kumai, M., [1976, p.833-841] MP 853
Boundary integral equation solution for phase change prob- lems. O'Neill, K., [1983, p.1825-1850] MP 2093	Kohnen, H., et al, [1979, p.4865-4874] MP 1239 Ultrasonic tests of Byrd Station ice cores. Gow, A.J., et al,	 Victorie Land Antarctic soil studies using a scanning electron microscope.
Multivariable regression algorithm. Blaisdell, G.L., et al,	(1979, p.147-153) MP 1282	Kumai, M., et al. (1978, p.106-112) MP 1386
[1983, 41p.] SR 83-32 Mathematical modeling of river ice processes. Shen, H.T.,	Time-priority studies of deep ice cores. Gow, A.J., [1980, p.91-102] MP 1306	Radar wave speeds in polar glaciers. Jezek, K.C., et al, [1983, p.199-208] MP 2857
(1984, p.554-558) MP 1973	Crary Ice Rise	Voctok Station
Anchors Stake driving tools: a preliminary survey. Kovacs, A., et al,	Changes in the Ross Ice Shelf dynamic condition. Jezek, K.C., [1984, p.409-416] MP 2058	Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al, [1981, p.79-81] MP 1541
[1977, 43p.] SR 77-13	—Dome C	-Weddell See
Towing ships through ice-clogged channels by warping and kedging. Mellor, M., (1979, 21p.) CR 79-21	Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, R.C., [1985, p.242-251] MP 1817	Choanoflagellata from the Weddell Sea, summer 1977. Buck, K.R., [1980, 26p.] CR 80-16

Chosnofiagellates from the Weddell Sea. Buck, K.R., MP 1453	Arctic vegetation Vegetative research in arctic Alaska. Johnson, P.L., et al.	Avalanche mechanics Acoustic emissions in the investigation of avalanches. St
CRREL 2-inch frazil ice sampler. Rand, J.H., (1982, 8p.) SR 82-69	[1973, p.169-198] MIP 1006 Artificial treesing	Lawrence, W.F., [1977, p.VII/24-VII/33] MP 1630 Dynamics of snow avalanches. Mellor, M., [1978, p.753-792] MP 1670
On modeling the Weddell Sea pack ice. Hibler, W.D., III, et al, [1982, p.125-130] MP 1549	Thermal and creep properties for frozen ground construction. Sanger, F.J., et al, [1978, p.95-117] MIP 1624	792 ₁ MP 1076 Avalenche triggering
Physical and structural characteristics of antarctic sea ice. Gow, A.J., et al, [1982, p.113-117] MP 1548	Thermal and creep properties for frozen ground construction. Sanger, F.J., et al, 1979, p.311-3371 MIP 1227	Acoustic emission response of snow. St. Lawrence, W.F.
Numerical simulation of the Weddell Sea pack ice. Hibler,	Mechanical properties of frozen ground. Ladanyi, B., et al,	Analysis of non-steady plastic shock waves in snow. Brown
US/USSR Weddell Polynya expedition, Upper air data, 1981.	(1979, p.7-18 ₁ Initial stage of the formation of soil-laden ice lenses. Takagi. S., (1982, p.223-232) MP 1596	R.L., (1980, p.279-287) MP 1354 Avalenche wind
Andress, E.L., [1983, 288p.] SR 83-13 Surface meteorology US/USSR Weddell Polynya Expedition,	S., (1982, p.223-232) MP 1596 Preczing of soil with surface convection. Lunardini, V.J.,	Dynamics of snow avalanches. Mellor, M., (1978, p.753-792) MP 1876
1981. Andress, E.L., et al, [1983, 32p.] SR 83-14 Physical mechanism for establishing algal populations in frazil	(1982, p.205-212) MIP 1595 Solution of phase change problems. O'Neill, K., (1983,	Avalenches
ice. Garrison, D.L., et al, [1983, p.363-365] MP 1717	p.134-146 ₁ MP 1894	Dynamics of snow and ice masses. Colbeck, S.C., ed. [1980, 468p.] MP 1297
Relative abundance of diatoms in Weddell Sea pack ice. Clarke, D.B., et al, (1983, p.181-182) MP 1786	Potential use of artificial ground freezing for contaminant immobilization. Iskandar, I.K., et al, [1985, 10p.] MP 2029	Backscattering Imaging radar observations of frozen Arctic lakes. Elachi.
Riemental compositions and concentrations of micro- pherules in snow and pack ice from the Weddell Sea.	Ground freezing for management of hazardous waste sites.	C., et al., [1976, p.169-175] MP 1284 Surface-based scatterometer results of Arctic sea ice. On-
Kumai, M., et al, [1983, p.128-131] MP 1777	Sullivan, J.M., Jr., et al, [1985, 15p.] MIP 2030 Artificial ice	stott, R.G., et al, [1979, p.78-85] MP 1266
Antarctic ses ice microwave signatures. Comiso, J.C., et al. [1984, p.662-672] MP 1668	Mass transfer along ice surfaces. Tobin, T.M., et al, r1977, p.34-37; MP 1091	Comparative near-millimeter wave propagation properties of anow or rain. Nemarich, J., et al., (1983, p.115-129)
Ses ice and biological activity in the Antarctic. Clarke, D.B., et al, [1984, p.2087-2095] MP 1701	Crystalline structure of urea ice sheets used in modeling in the CRREL test basin. Gow, A.J., [1984, p.241-253]	MP 1696 Attenuation and backscatter for snow and sleet at 96, 140, and
Drag coefficient across the Antarctic marginal ice zone. Andreas, B.L., et al, (1984, p.63-71) MP 1784	MP 1835	225 GHz. Nemarich, J., et al, (1984, p.41-52) MP 1864
Sea ice data buoys in the Weddell Sea. Ackley, S.F., et al, [1984, 18p.] CR 84-11	Artificial islands Foundations of structures in polar waters. Chamberlain,	Bacteria Health aspects of water reuse in California. Reed, S.C.
Ice dynamics. Hibler, W.D., III, [1984, 52p.] M 84-03	E.J., [1981, 16p.] SR 81-25 Offshore mechanics and Arctic engineering, symposium,	(1979, p.434-435) MIP 1404
Heat and moisture advection over antarctic sea ice. An-	1983. [1983, 813p.] MP 1581 Artificial melting	Disinfection of wastewater by microwaves. lakandar, I.K., et al, [1980, 15p.] SR 98-01
dress, E.L., [1985, p.736-746] MP 1888 Ses ice microbial communities in Antarctica. Garrison,	Bubbler induced melting of ice covers. Keribar, R., et al. [1978, p.362-366] MP 1160	Microbiological aerosols from waste water. Beasum, H.T., et al., (1983, p.65-75) MIP 1578
D.L., et al, [1986, p.243-250] MP 2026 -Wright Valley	Artificial succession	Sea ice microbial communities in Antarctica. Garrison. D.L., et al, [1986, p.243-250] MP 2024
Examining antaretic soils with a scanning electron micro- scope. Kumai, M., et al. [1976, p.249-252] MP 931	Ice crystal formation and supercooled fog dissipation. Kumai, M., [1982, p.579-587] MIP 1539	Bellevas
Antennas	Atmospheric circulation Sea-ice atmosphere interactions in the Weddell Sea using	Aerostat icing problems. Hanamoto, B., [1983, 29p.] SR 83-23
Deicing a satellite communication antenna. Hanamoto, B., et al, [1980, 14p.] SR 80-18	drifting buoys. Ackley, S.F., [1981, p.177-191] MP 1427	Baltic Sea Size and shape of ice floes in the Baltic Sea in spring. Lep-
Antifreezes Winter maintenance research needs. Minak, L.D., [1975,	Atmospheric turbulence measurements at SNOW-ONE-B.	pitranta, M., _{[1983} , p.127-136 _] NIP 2061 Banka (waterways)
p.36-38 ₁ MP 950 Preezing and thawing tests of liquid deicing chemicals on	Drag coefficient across the Antarctic marginal ice zone. An-	Sediment displacement in the Ottauquechee River-1975-
selected pavement materials. Minsk, L.D., (1979, p.51-58) MP 1220	dress, E.L., et al., [1984, p.63-71] MIP 1784 Atmospheric composition	1978. Martinson, C.R., [1980, 14p.] SR 88-20 Bank erosion of U.S. northern rivers. Getto, L.W., [1982,
Arctic environment	Trace gas analysis of Arctic and subarctic atmosphere. Murrmann, R.P., (1971, p.199-203) MP 908	75p. ₁ CR 82-11 Reservoir bank erosion caused and influenced by ice cover.
Progress report on ERTS data on Arctic environment. Anderson, D.M., et al, [1972, 3p.] MP 991	Atmospheric density	Gatto, L.W., [1982, 26p.] SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto,
Arctic lanadecapes Arctic transportation: operational and environmental evalua-	Snow concentration and effective air density during snow- falls. Mellor, M., [1983, p.505-507] MP 1769	L.W., et al, [1983, 103p.] SR 83-30
tion of an air cushion vehicle in northern Alaska. Abele, G., et al, [1977, p.176-182] MP 985	Atmospheric pressure Depth of water-filled crevates that are closely spaced. Rob-	Erosion of perennially frozen streambanks. Lawson, D.E. [1983, 22p.] CR 83-29
Arctic landscapes Environmental setting, Barrow, Alaska. Brown, J., (1970,	in, G. de Q., et al, [1974, p.543-544] MIP 1038 Sea-ice atmosphere interactions in the Weddell Sea using	Bank recession of the Tanana River, Alaska. Gatto, L.W., [1984, 59p.] MIP 1746
p.50-64 ₁ MP 945	drifting buoys. Ackley, S.F., [1981, p.177-191] MP 1427	Erosion analysis of the Tanana River, Alaska. Collins, C.M., [1984, 8p. + figs.] MP 1748
Trends in carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al, [1972, p.40-45] MP 1376	Comparison of different sea level pressure analysis fields in the East Greenland Sea. Tucker, W.B., (1983, p.1084-	Tanana River monitoring and research studies near Fairbanka, Alaska. Neill, C.R., et al., 1984, 98p. + 5 ap-
Arctic environment and the Arctic surface effect vehicle. Sterrett, K.F., [1976, 28p.] CR 76-01	1088 ₁ MIP 1737	pends.; SR 84-37
Upland forest and its soils and litters in interior Alaska. Troth, J.L., et al., (1976, p.33-44) MP 367	Atomic absorption Blank corrections for ultratrace atomic absorption analysis.	Bank recession and channel changes of the Tanana River Alaska. Gatto, L.W., et al. [1984, 98p.] MP 1747
Revegetation in arctic and subarctic North America—a litera- ture review. Johnson, L.A., et al. (1976, 32p.)	Cragin, J.H., et al, [1979, 5p.] CR 79-03 Attunuation	Bank erosion, vegetation and permafrost, Tanana River near Fairbanks. Gatto, L.W., (1984, 53p.) SR 84-21
CR 76-15 Air-cushion vehicle effects on surfaces of Alaska's Arctic	Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al, [1983,	Reservoir bank erusion caused by ice. Gatto, L.W., [1984, p.203-214] MP 1787
Slopes. Slaughter, C.W., [1976, p.272-279] MP 1384	p.103-111 ₂ MP 1757 Comparative near-millimeter wave propagation properties of	Shoreline erosion processes: Orwell Lake, Minnesota. Reid, J.R., (1984, 101p.) CR 84-32
Ecological and environmental consequences of off-road traf- fic in northern regions. Brown, J., [1976, p.40-53]	snow or rain. Nemarich, J., et al, (1983, p.115-129) MP 1690	Bethymetry
MP 1383 Canol Pipeline Project: a historical review. Ueda, H.T., et al.	Utilization of the snow field test series results for development of a snow obscuration primer. Ebersole, J.F., et al, [1983,	Coastal marine geology of the Beaufort, Chukchi and Bering Seas. Gatto, L.W., [1980, 357p.] SR 88-65
(1977, 32p.) SR 77-34	p. 209-217 MP 1692 Attenuation and backscatter for snow and sleet at 96, 140, and	Bearing strength Piles in permafrost for bridge foundations. Crory, F.E., et al.
Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., (1978,	225 GHz. Nemarich, J., et al, [1984, p.41-52]	[1967, 41p.] MP 1411 Bearing capacity of floating ice plates. Kerr, A.D., (1976,
p.460-466j MP 1100 Aretic Ocean	Catalog of smoke/obscurant characterization instruments.	p.229-268 ₃ Mr 884
Arctic Ocean temperature, salinity and density, March-May 1979. McPhee, M.G., [1981, 20p.] SR 81-05	O'Brien, H.W., et al, [1984, p.77-82] MP 1865 Approach to snow propagation modeling. Koh, G., [1984,	Nondestructive testing of in-service highway pavements in Maine. Smith, N., et al., [1979, 22p.]
Understanding the Arctic sea floor for engineering purposes. [1982, 141p.] SR 83-25	p.247-259 ₁ MP 1869 Laboratory studies of acoustic scattering from the underside	Snow studies associated with the sideways move of DYE-3. Tobiasson, W., [1979, p.117-124] MP 1312
Science program for an imaging radar receiving station in Alaska. Weller, G., et al, [1983, 45p.] MP 1884	of sea ice. Jezek, K.C., et al, (1985, p.87-91) MP 1912	Sulfur foam as insulation for expedient roads. Smith, N., et al, (1979, 21p.) CR 79-18
Mechanical properties of ice in the Arctic seas. Weeks,	Angers	Evaluation of ice-covered water crossings. Dean, A.M., Jr., [1980, p.443-453] MP 1348
W.F., et al., [1984, p.235-259] MP 1674 Shore ice override and pileup features, Beaufort Sea.	Kinematics of axial rotation machines. Mellor, M., 1976, 45p.; CR 76-16	Structural evaluation of porous pavement in cold climate
Kovaca, A., (1984, 28p. + map) CR 84-26 Sea ice penetration in the Arctic Ocean. Weeks, W.P.,	Conventional land mines in winter. Richmond, P.W., [1984, 23p.] SR 84-30	Raton, R.A., et al. (1980, 43p.) SR 80-39 Pull-depth and granular base course design for frost areas
[1984, p.37-65] MP 1993 Physical properties of the sea ice cover. Weeks, W.F.,	Prototype drill for core sampling fine-grained perennially frozen ground. Brockett, B.E., et al. (1985, 29p.)	Raton, R.A., et al, (1983, p.27-39) MP 1492 Bearing tests
(1986, p.87-102) MP 2047 Remote sensing of the Arctic sens. Weeks, W.F., et al,	CR 85-01 Ice-coring augers for shallow depth sampling. Rand, J.H., et	Effect of freeze-thaw cycles on resilient properties of fine- grained soils. Johnson, T.C., et al, (1978, 19p.)
(1986, p.59-64) MP 2117 Arctic soils	al, [1985, 22p.] CR 85-21 Avalanche deposits	MP 1082 Freeze thaw effect on resilient properties of fine soils. John-
Pedologic investigations in northern Alaska. Tedrow, J.C.F., (1973, p.93-108) MP 1805	Detection of sound by persons buried under snow avalanche.	son, T.C., et al, (1979, p.247-276) MP 1226
Aretic topography	Avalanche formation	Besidert Sea Delineation and engineering characteristics of permafros
Morphology of the North Slope. Walker, H.J., [1973, p.49-	Acoustic emission response of snow. St. Lawrence, W.F.,	beneath the Beaufort Sea. Sellmann, P.V., et al., [1976,

Begineering properties of submarine permafrost near Prudhoe	Primary productivity in sea ice of the Weddell region. Ackley, S.F., et al, [1978, 17p.] CR 78-19	Distribution and properties of subses permafrost of the Beau- fort Sea. Sellmann, P.V., et al, (1979, p.93-115)
Bagineering properties of submarine permafrost near Prudhoe Bay. Chamberlain, E.J., et al., ¿1978, p.629-635- MP 1184	Arctic ecosystem: the constal tundra at Barrow, Alaska. Brown, J., ed, [1980, 571p.] MP 1355	MP 1287 Permafrost distribution on the continental shelf of the Beau-
Subsea permafrost study in the Beaufort Sea, Alsaka. Sell-	See ice studies in the Weddell See aboard USCGC Polar See.	fort Sea. Hopkins, D.M., et al, [1979, p.135-141]
menn, P.V., et al., [1979, p.207-213] MP 1591 Permafrost distribution on the continental shelf of the Besu-	Ackley, S.F., et al, [1980, p.84-96] MP 1431 Analysis of processes of primary production in tundra growth	MP 1288 Calculating borehole geometry. Jezek, K.C., et al, [1984,
fort Sea. Hopkins, D.M., et al, [1979, p.135-141] MP 1288	forms. Tieszen, L.L., et al, [1981, p.285-356] MP 1433	18p.j SE 84-15 lee flow leading to the deep core hole at Dye 3, Greenland.
Distribution and properties of subsea permafrost of the Beau-	Limnology and primary productivity, Lake Koocanusa, Mon-	Whillans, I.M., et al, [1984, p.185-190] MP 1824
fort Sea. Selimann, P.V., et al, [1979, p.93-115] MP 1287	tana. Woods, P.F., et al, [1982, 106p.] SR 82-15	Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817
Hyperbolic reflections on Besufort Ses seismic records.	Thermal and load-associated distress in pavements. John-	Dielectric studies of permafrost. Arcone, S.A., et al, [1985,
Neave, K.G., et al, [1981, 16p.] CR 81-82 Delineation and engineering of subsea permafrost, Beaufort	son, T.C., et al, [1978, p.403-437] MIP 1289 Asphalt concrete for cold regions. Dempsey, B.J., et al,	p.3-5 ₁ MP 1951 Bettom ice
Sea. Sellmann, P.V., et al, [1981, p.137-156]	[1980, 55p.] CR 88-85 Roofs in cold regions: Marson's Store, Claremont, New	loe blockage of water intakes. Carey, K.L., [1979, 27p.] MIP 1197
Site investigations and submarine soil mechanics in polar re-	Hampshire. Tobissson, W., et al, [1980, 13p.]	Ross Ice Shelf bottom ice structure. Zotikov, I.A., et al,
gions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Foundations of structures in polar waters. Chamberlain,	SR 80-25 Fabric installation to reduce cracking on runways. Eaton,	[1979, p.65-66] MP 1336 Oil pooling under sea ice. Kovacs, A., [1979, p.310-323]
R.J., [1981, 16p.] SR 81-25	R.A., et al, [1981, 26p.) SR 81-10	MP 1289
Alaska's Beaufort Sea coast ice ride-up and pile-up features. Kovacs, A., [1983, 51p.] CR 83-89	Roof moisture survey. Tobiasson, W., et al, [1981, 18p.] SR 81-31	Bottom sediment 1977 CRREL-USGS permafrost program Beaufort Sea, Alas-
Seismic velocities and subsex permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.894-898]	Procee-thaw tests of liquid deicing chemicals on selected	ka, operational report. Sellmann, P.V., et al. [1977, 19p.] SE 77-41
MP 1665	pavement materials. Minsk, L.D., [1977, 16p.] CR 77-28	Permafrost beneath the Beaufort Sea. Sellmann, P.V., et al,
W.P., et al, [1983, 34p. + map] CR 83-21	Effects of subgrade proparation upon full depth pavement	[1978, p.50-74] MP 1286 Overconsolidated sediments in the Beaufort Sea. Chamber-
Summary of the strength and modulus of ice samples from multi-year pressure ridges. Cox, G.F.N., et al, (1984,	performance in cold regions. Eaton, R.A., 1978, p.459-473, MP 1067	lain, E.J., [1978, p.24-29] MIP 1255
p.126-133 ₁ MP 1679	Temperature effects in compacting an asphalt concrete over-	Penetration tests in subsea permafrost, Prudhoe Bay, Alaska. Blouin, S.B., et al, [1979, 45p.] CR 79-67
Variation of ice strength within and between multiyear pressure ridges in the Beaufort Sea. Weeks, W.F., [1984,	lay. Baton, R.A., et al, (1978, p.146-158) MP 1003 Resiliency of subgrade soils during freezing and thawing.	Permafrost distribution on the continental shelf of the Beau- fort Sea. Hopkins, D.M., et al, [1979, p.135-141]
p.134-139 ₁ MP 1600 Subsea permafrost distribution on the Alaskan shelf. Seli-	Johnson, T.C., et al. [1978, 59p.] CR 78-23 Design of sirfield pevements for seasonal frost and permafrost	MP 1288
mann, P.V., et al, (1984, p.75-82) MP 1852	conditions. Berg, R.L., et al, (1978, 18p.) MP 1189	Distribution and properties of subsea permafrost of the Beaufort Sea. Sellmann, P.V., et al, [1979, p.93-115]
Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et	Thermal and load-associated distress in pavements. Johnson, T.C., et al. (1978, p.403-437) MP 1289	MP 1287 Distribution and features of bottom sediments in Alaskan
al, [1984, p.237-258] MP 1839 Some probabilistic aspects of ice gouging on the Alsakan Shelf	Full-depth pavement considerations in seasonal frost areas.	coastal waters. Sellmann, P.V., [1980, 50p.]
of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-	Baton, R.A., et al, [1979, 24p.] MP 1188 Asphalt concrete for cold regions. Dempsey, B.J., et al,	SR 80-15 Sediment displacement in the Ottauquechee River—1975-
236 ₁ MP 1838 Shore ice override and pileup features, Beaufort Sea.	(1980, 55p.) CR 88-05 Field cooling rates of asphalt concrete overlays at low temper-	1978. Martinson, C.R., [1980, 14p.] SR 88-20 Characteristics of permafrost beneath the Beaufort Sea. Sell-
Kovaca, A., [1984, 28p. + map] CR 84-26	atures. Baton, R.A., et al, [1980, 11p.] CR 36-36	mann, P.V., et al, [1981, p.125-157] MIP 1428
Structure, salinity and density of multi-year sea ice pressure ridges. Richter-Menge, J.A., et al., [1985, p.194-198]	Structural evaluation of porous pavement in cold climate. Eaton, R.A., et al, [1980, 43p.] SR \$8-39	Hyperbolic reflections on Beaufort Sea seismic records. Neave, K.G., et al, [1981, 16p.] CR \$1-02
MP 1857 Compressive strength of pressure ridge ice samples. Richter-	Effect of color and texture on the surface temperature of	Subsea trenching in the Arctic. Mellor, M., [1981, p.843-
Menge, J.A., et al., [1985, p.465-475] MP 1877	asphalt concrete pavements. Berg, R.L., et al. 1983, p.57-61, MP 1652	Bottom heat transfer to water bodies in winter. O'Neill, K.,
Study of sea ice induced gauges in the sea floor. Weeks, W.F., et al, (1985, p.126-135) MP 1917	Comparison of three compactors used in pothole repair. Snelling, M.A., et al, [1984, 14p.] SR 84-31	et al, [1981, 8p.] SR 81-18 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et
Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, (1985, p.393-407) MP 1904	Frost heave of full-depth asphalt concrete pavements. Zom-	al, [1982, 62p.] CR 82-24
Structure, salinity and density of multi-year sea ice pressure	erman, I., et al, (1985, p.66-76) MP 1927 Blasting	Potential use of SPOT HRV imagery for analysis of coastal sediment plumes. Band, L.E., et al, [1984, p.199-204]
ridges. Richter-Menge, J.A., et al, (1985, p.493-497) MP 1965	Dynamic in-situ properties test in fine-grained permafrost. Blouin, S.E., [1977, p.282-313] MP 963	MP 1744 Mapping resistive scabed features using DC methods. Sell-
Bouch marks Vestically stable bounders also supplied of enisting informa-	Testing shaped charges in unfrozen and frozen silt in Alsaka.	mann, P.V., et al, [1985, p.136-147] MP 1918
Vertically stable benchmarks: a synthesis of existing informa- tion. Gatto, L.W., [1985, p.179-188] MP 2069	Smith, N., 1982, 10p.] SR 82-02 Blasting and blast effects in cold regions. Part 1: Air blast.	lce gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.393-407, MP 1984
Bering Sea Sea ice rubble formations off the NE Bering Sea and Norton	Mellor, M., [1985, 62p.] SR 85-25 Blowing snow	Freeze thaw consolidation of sediments, Beaufort Sea, Alaska. Lee, H.J., et al, [1985, 83p.] MP 2025
Sound. Kovaca, A., t1981, p.1348-1363 MP 1527	Snow Symposium, 1st, Hanover, NH, Aug. 1981. [1982,	Bottom topography
Bering Strait Bering Strait sea ice and the Fairway Rock icefoot. Kovacs,	324p.; SR 82-17 Snow Symposium, 2nd, 1982, (1983, 295p.) SR 83-04	Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, (1983, 34p. + map) CR 83-21
A., et al, ¿1982, 40p.; CR 82-31 Bibliographies	Performance and optical signature of an AN/VVS-1 laser	Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sca. Weeks, W.F., et al, [1984, p.213-
Bibliography of the Barrow, Alaska, IBP ecosystem model.	rangefinder in falling anow: Preliminary test results. Lacombe, J., [1983, p.253-266] MP 1759	236 ₁ MIP 1838
Brown, J., [1970, p.65-71] MP 946 Bearing capacity of floating ice plates. Kerr, A.D., [1976,	Utilization of the snow field test series results for development of a snow obscuration primer. Ebersole, J.F., et al, [1983,	Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.126-135] MIP 1917
p.229-268 ₁ MP 884	p.209-217 ₁ MP 1692	Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al. [1985, p.393-407] MIP 1904
Bibliography on harbor and channel design in cold regions. Haynes, F.D., [1976, 32p.] CR 76-03	Helicopter snow obscuration sub-test. Ebersole, J.F., [1984, p.359-376] MP 2094	Laboratory study of flow in an ice-covered sand bed channel.
Infrared thermography of buildings: an annotated bibliography. Marshall, S.J., [1977, 21p.] SR 77-09	Clear improvement in obscuration. Palmer, R.A., 1985, p.476-477, MP 2067	Wuebben, J.L., [1986, p.3-14] MP 2123 Boundary layer
Bibliography of soil conservation activities in USSR perma-	Meteorological variation of atmospheric optical properties in	Abiotic overview of the Tundra Biome Program, 1971.
frost areas. Andrews, M., {1977, 116p.; SR 77-07 Bibliography of permafrost soils and vegetation in the USSR.	an antarctic storm. Egan, W.G., et al., t1986, p.1155- 1165 ₁ MP 2899	Weller, G., et al, [1971, p.173-181] MIP 906 Oceanic boundary-layer features and oscillation at drift sta-
Andrews, M., (1978, 175p.) SR 78-19 Infrared thermography of buildings—a bibliography with ab-	Booms (equipment) Boom for shipboard deployment of meteorological instru-	tions. McPhee, M.G., [1980, p.870-884] MP 1369 Nonsteady ice drift in the Strait of Belle lale. Sodhi, D.S.,
stracts. Marshall, S.J., [1979, 67p.] SR 79-01	ments. Andreas, B.L., et al, [1983, 14p.] SR 83-28	et al, [1980, p.177-186] MIP 1364
Bibliography on techniques of water detection in cold regions. Smith, D.W., comp, (1979, 75p.) SR 79-10	Simple boom for use in measuring meteorological data from a ship. Andreas, B.L., et al, [1984, p.227-237]	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al, [1981, p.76-81] MP 1494
Cold Regions Science and Technology Bibliography. Cummings, N.H., (1981, p.73-75) MP 1372	MP 1752 Borehole instruments	Sea ice drag laws and boundary layer during rapid melting. McPhee, M.G., [1982, 17p.] CR 82-04
Mobility bibliography. Liston, N., comp, [1981, 313p.]	Resurvey of the "Byrd" Station, Antarctica, drill hole. Gar-	Atmospheric dynamics in the antarctic marginal ice zone.
SR 81-29 Bibliography on glaciers and permafrost, China, 1938-1979.	field, D.E., et al, [1976, p.29-34] MP 846 Dynamics and energetics of parallel motion tools for cutting	Andreas, E.L., et al, [1984, p.649-661] MP 1667 Stefan problem in a finite domain. Takagi, S., [1985, 28p.]
Shen, J., ed, [1982, 44p.] SR 82-20	and boring. Mellor, M., [1977, 85p.] CR 77-67 Design for cutting machines in permafrost. Mellor, M.,	SR 85-06
Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al.	[1978, 24p.] CR 78-11	Boundary value problems Viscous wind-driven circulation of Arctic sea ice. Hibler,
(1983, 82p.) SR 83-69 U.S. tundra biome publication list. Brown, J., et al, (1983,	Ice drilling technology. Holdsworth, G., ed, [1984, 142p.] SR 84-34	W.D., III, et al, [1977, p.95-133] MP 963 Moving boundary problems in the hydrodynamics of porous
29p. ₁ SR 83-29	Bereholes	media. Nakano, Y., [1978, p.125-134] MP 1343
User's guide for the BIBSORT program for the IBM-PC personal computer. Kyriakakis, T., et al, [1985, 61p.]	Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MP 861	In-plane deformation of non-coaxial plastic soil. Takagi, S., [1978, 28p.] CR 78-07
SR 85-04 Topical databases: Cold Regions Technology on-line. Lis-	Hest transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] CR 76-12	Buckling pressure of an elastic floating plate. Takagi, S., [1978, 49p.] CR 78-14
ton, N., et al, (1985, p.12-15) MP 2627	Geodetic positions of borehole sites in Greenland. Mock,	Hydraulic model investigation of drifting snow. Wuebben,
Bibliography of the Barrow, Alaska, IBP ecosystem model.	S.J., (1976, 7p.) CR 76-41 Permafrost beneath the Beaufort Sea. Sellmann, P.V., et al,	J.L., [1978, 29p.] CR 78-16 Evaluation of the moving boundary theory. Nakano, Y.,
Brown, J., (1970, p.65-71) MIP 946	(1978, p.50-74) MP 1206	[1978, p.142-151] MP 1147

be application of a single incided. McPhas, M.C., (1978). Tables, S., (1978, p.1094-1075. Tables, S., (1978, p.1094-1075. Tables, S., (1978, p.1094-1075. May 1.24 Tables, S., (1978, p.1094-1075. Tables, S., (1978, p.1094-1075. May 1.24 Tables, S., (1978, p.1094-1075. Tables, S., (1978, p.	MP 171. wrence River hanging ice dam 241-2491 MP 183. over formation in the Upper Si T., et al. (1984, p.27-245) wriver ice cover thickness single process anow. MP 181. or river ice cover thickness single process anow. Colbeck, S.C. MP 121: strandynamics of cold capillar- 1981, 9p.] SR 81-8. It lipid levels in Arctic plants 2, p.40-45] MP 137. the Arctic tundra. Coyne, P.I. MP 98. undra vegetation. Coyne, P.I. MP 137. undardization of carbon dioxid J., -t al. (1973, p.163-181) MP 137. dey, S.F., (1984, p.86-95) MP 184. dey, S.F., (1984, p.86-95) MP 184. dey, S.F., (1984, p.86-95) MP 187. in mafrost to climatic warming 14, p.92-1051 MP 171. oncrete pavement. Kovacs, A CR 83-1: It lipid levels in Arctic plants 2, p.40-451 MP 137. frost penetration beneath pave, (1976, 41p.; SR 76-0 expedient roads. Cm 137. in process and particular plants J.M., (1976, 60p.) CR 76-2; c buildings with urea-formalde L, et al., [1977, p.478-487] mp 138. SR 82-6; insulation in recently construct insulation in recently construct	Field investigation of St. Lawrence River Shen, H.T., et al., [1984, p.241-249] Computer simulation of ice cover formatic Lawrence River. Shen, H.T., et al., [1985, p.34-6] Lawrence River. Shen, H.T., et al., [1985, p.34-6] Lawrence River. Shen, H.T., et al., [1985, p.34-6] Lawrence River through heterogeneous anough the state of the state o	ice. Fish, A.M., [1983, p.3-24] MP 1682 Mages Inagement of power plant waste heat in cold regions. As- not, H.W.C., [1975, p.22-24] MP 942 tecting structural heat losses with mobile infrared thermog- sphy, Part IV. Munis, R.H., et al, [1976, 9p.] Imporary environment. Cold regions habitability. Bech- el, R.B., et al, [1976, 162p.] SR 76-10 ergy conservation in buildings. Ledbetter, C.B., [1976, 197] mputer derived heat requirements for buildings in cold egions. Bennett, F.L., [1977, 113p.] sentineering facility heated with a central heat pump system. Asmot, H.W.C., et al, [1977, 4p.] Amot, H.W.C., et al, [1977, 4p.] MP 939 rared thermography of buildings: an annotated bibliogra- shy. Marshall, S.J., [1977, 21p.] sesuring unmetered steam use with a condensate pump ycle counter. Johnson, P.R., [1977, p.434-442] MP 957 insulating old wood frame buildings with trea-formaldo- ycle foam. Tobiasson, W., et al, [1977, p.478-487] MP 958 size heat recovery for building heating. Sector, P.W., 1977, 24p.] intatining buildings in the Arctic. Tobiasson, W., et al, 1977, p.244-251; intatining buildings in the Arctic. Tobiasson, W., et al, 1977, 17p.] rared thermography of buildings. Munis, R.H., et al, 1977, 11p.] rared thermography of buildings. Munis, R.H., et al, 1977, 12p.] rared thermography of buildings. Munis, R.H., et al, 1977, 12p.; say 7-28 response architectural programming. Making socially responsive ar- chitectural programming. Ledbetter, C.B., [1978, 7p.] SR 78-82 Azebue hospital—a case study. Croy, F.R., [1978, 7p.]	ioe: application of a simple model. McPhee, M.G., [1979, p. 383-400] Steady in-plane deformation of noncoaxial plastic soil. MR 1248 Application of recent results in functional analysis to the problem of water tables. Nakano, Y., [1979, p. 185-190) MP 1269 Grain clusters in wet snow. Colbeck, S.C., [1979, p. 351-190, MP 1267 Punctional analysis of the problem of wetting fronts. Nakano, Y., [1980, p. 314-315] Water and air horizontal flow in porous media. Nakano, Y., [1980, p. 314-316] Water and air vertical flow through porous media. Nakano, Y., [1980, p. 124-133] Water and air vertical flow through porous media. Nakano, Y., [1980, p. 124-133] Deforming finite elements with and without phase change. Lynch, D.R., et al, [1981, p.81-96] Boundary integral equation solution for phase change problems. O'Neill, K., [1983, p. 125-1850] MP 1493 Boundary value problem of flow in porous media. Nakano, Y., (1983, p. 205-213) Modeling two-dimensional freezing. Albert, M.R., [1984, 45p.] Bridges Piles in permafrost for bridge foundations. Crory, F.E., et al, (1967, 41p.) Failure of an ice bridge. DenHartog, S.L., et al, [1971, 44p.) CR 76-29 Ice breakup on the Chena River 1975 and 1976. McPsadden, T., et al, [1977, 44p.) Arching of model ice floes at bridge piers. Calkina, D.J., (1978, p.495-507) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, [1990, 17p.) CR 80-25
Smartly in-place deformation of sourceast plants (e.g., 1971), p.109-1073, p.1	241-249, MP 133 cover formation in the Upper Si I.T., et al., [1984, p.227-245] MP 131. or river ice cover thickness simu [1985, p.54-62] MP 266. eneous snow. Colbeck, S.C. MP 1219: ermodynamics of cold capillar- 1981, 9p., SR 81-6. I lipid levels in Arctic plants 2, p.40-45] MP 137. the Arctic tundra. Coyne, P.I. MP 96. undra vegetation. Coyne, P.I. MP 97. undra vegetation. Coyne, P.I. MP 137. undardization of carbon dioxid J., et al., [1973, p.163-181] MP 137. dey, S.F., [1984, p.88-95] dey, S.F., [1984, p.88-95] mafrost to climatic warming 14, p.92-105] MP 131 oncrete pavement. Kovacs, A. CR 83-18 I lipid levels in Arctic plants 2, p.40-45; MP 137 frost penetration beneath pave, (1976, 41p.) expedient roads. Smith, N., et al., [1987, p.478-487] me—puncture, stiffness, temper J.M., [1976, 60p.] e buildings with ures-formalde f., et al., [1977, p.478-487] with cellular plastic insulation in recently construct st al., [1983, p.168-173] with cellular plastic insulation in recently construct st al., [1983, p.168-173]	Shen, H.T., et al., [1984, p.241-249] Computer simulation of ice cover formati-Lawreace River. Shen, H.T., et al., [1985, p.54-6] Lawreace River. Shen, H.T., et al., [1985, p.54-6] Lawreace River. Shen, H.T., et al., [1985, p.54-6] Lawreace River through heterogeneous snow [1979, p.37-45] Introduction to the basic thermodynamic systems. Colbeck, S.C., [1981, 9p.] Larbahyarates Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p.40-45] Larban dioxide dynamics on the Arctic tu et al., [1971, p.48-52] Carbon dioxide exchange in tundra vegets et al., [1971, p.48-53] Case for comparison and standardization reference gases. Kelley, J.J., et al., [19 CO2 effect on permafrost terrain. Brow 30p.] West antarctic sea ice. Ackley, S.F., [19 Potential responses of permafrost to Goodwin, C.W., et al., [1984, p.92-105] Lawreace River Ri	magement of power plant waste heat in cold regions. Aanot, H.W.C., [1975, p.22-24]. MP 942 teeting structural heat losses with mobile infrared thermography, Part IV. Munis, R.H., et al., [1976, 9p.] mporary environment. Cold regions habitability. Bechel, R.B., et al., [1976, 162p.] mporary environment. Cold regions habitability. Bechel, R.B., et al., [1976, 162p.] mporary conservation in buildings. Ledbetter, C.B., [1976, 19.] SR 76-19 mputer derived heat requirements for buildings in cold egions. Bennett, F.L., [1977, 113p.] SR 77-49. sengineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 4p.] streed hermography of buildings an annotated bibliography. Marshall, S.J., [1977, 21p.] satisfies for architectural programming of office settings. SR 77-49. idelines for architectural programming of office settings. SR 77-49. satisfies and scientists in research for design of buildings in the Arctic. Tobiasson, W., et al., [1977, p.244-251]. instalating buildings in the Arctic. Tobiasson, W., et al., 1977, 124p.] chitects and scientists in research for design of buildings in blasts. Ledbetter, C.B., [1977, 8p.] tared thermography of buildings. Munis, R.H., et al., 1977, 11p.] sard thermography of buildings. Munis, R.H., et al., 1977, 11p.] sard thermography of buildings. Munis, R.H., et al., 1977, 11p.] sard thermography of buildings. Munis, R.H., et al., 1977, 11p.] sard thermography of buildings. Munis, R.H., et al., 1977, 11p.] sard thermography of buildings. Munis, R.H., et al., 1977, 11p.; sard thermography of buildings. Munis, R.H., et al., 1977, 11p.; sard thermography of buildings. Munis, R.H., et al., 1977, 11p.; sard thermography of buildings. Munis, R.H., et al., 1977, 11p.; sard thermography of buildings. Munis, R.H., et al., 1977, 11p.; sard thermography of buildings. Munis, R.H., et al., 1977, 11p.; sard thermography of buildings. Munis, R.H., et al., 1977, 11p.; sard thermography of buildings. Munis, R.H., et al., 1977, 11p.; sard thermograp	Seasdy is-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] MP 1248 Application of recent results in functional analysis to the problem of water tables. Nakano, Y., [1979, p.185-190). MP 1269 Grain clusters in wet snow. Colbeck, S.C., [1979, p.371-384] Pmectional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and sir horizontal flow in porous media. Nakano, Y., [1980, p.81-57] Water and sir vertical flow through porous media. Nakano, Y., [1980, p.124-133] Water and sir vertical flow through porous media. Nakano, Y., [1980, p.124-133] Deforming finite elements with and without phase change. Lynch, D.R., et al, [1981, p.81-96] Boundary integral equation solution for phase change problems. O'Neill, K., [1983, p.1825-1850] MP 1493 Boundary value problem of flow in porous media. Nakano, Y., (1983, p.205-213) Modeling two-dimensional freezing. Albert, M.R., [1984, 45p.] Evidence Price in permafrost for bridge foundations. Crory, F.E., et al, (1967, 41p.) Files in permafrost for bridge foundations. Crory, F.E., et al, (1967, 41p.) T., et al, [1977, 44p.) Arching of model ice floes at bridge piers. Calkina, D.J., (1978, p.495-507) Lee forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, (1980, 17p.) CR 28-25
Application of recent results in Smothered territors. Askinstr. (1979). p. 1971-1979. Proceedings of water tables. Nations. (1971). p. 1971-1979. Proceedings of the problem of work in some of the Nations. (1971). p. 1971-1979. Proceedings of the National Science of the	i.T., et al., [1984, p.227-245, MP 181: or river ice cover thickness simu [1985, p.54-62] MP 286: preseous snow. Colbeck, S.C. MP 121: preseous snow. Colbeck, S.C. MP 137: preseous	Lawrence River. Shen, H.T., et al., [1985, p.54-d. Lawrence River. Shen, H.T., et al., [1985, p.54-d. Laws and the property of	tecting structural heat losses with mobile inflared thermog- aphy, Part IV. Munis, R.H., et al., (1976, 5p.) CR 76-33 mporary environment. Cold regions habitability. Bechel, R.B., et al., (1976, 162p.) ergy conservation in buildings. Ledbetter, C.B., (1976, p.) Expression of the structural requirements for buildings in cold egions. Bennett, F.L., (1977, 113p.) engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., (1977, 4p.) Expression of the structural programming of office settings. SR 77-49 idelines for architectural programming of office settings. SR 77-49 insulating old wood frame buildings with urea-formalde- tyde foam. Tobiasson, W., et al., (1977, p.478-487) insulating old wood frame buildings with urea-formalde- tyde foam. Tobiasson, W., et al., (1977, p.478-487) insulating buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251; intaining buildings in the Arctic. Tobiasson, W., et al., (1977, 24p.) intaining buildings in the Arctic. Tobiasson, W., et al., (1977, 24p.) intaining buildings in the Arctic. Tobiasson, W., et al., (1977, 24p.) intaining buildings in the Arctic. Tobiasson, W., et al., (1977, 24p.) intaining buildings in the Arctic. Tobiasson, W., et al., (1977, 24p.) intaining buildings in the Arctic. Tobiasson, W., et al., (1977, 24p.) intaining buildings in the Arctic. Tobiasson, W., et al., (1977, 24p.) intaining buildings in the Arctic. Tobiasson, W., et al., (1977, 21p.) Fig. 77-23 interest thermography of buildings. Munis, R.H., et al., (1977, 21p.) Expression of winter construction. Bennett, F.L., (1977, 25p.) Expression of winter construction. Bennett, F.L., (1977, 25p.) Expression has a case attidy. Croy, F.R., (1978, 7p.) Exceptus hospital—a case study. Croy, F.R., (1978, 7p.)	Application of recent results in functional analysis to the problem of water tables. Nakano, Y., 1979, p. 185-190. MP 1269 Grain clusters in wet snow. Colbock, S.C., [1979, p. 371-384] Punctional analysis of the problem of wetting fronts. Nakano, Y., (1980, p. 314-315) Water and air horizontal flow in purous media. Nakano, Y., (1980, p. 81-85) Water and air vertical flow through porous media. Nakano, Y., (1980, p. 181-33) Water and air vertical flow through porous media. Nakano, Y., (1980, p. 181-35) MP 1342 Deforming finite elements with and without phase change. Lynch, D.R., et al., (1981, p. 81-96) Boundary integral equation solution for phase change problems. O'Nelll, K., (1983, p. 1825-1850) MP 2893 Boundary value problem of flow in porous media. Nakano, Y., (1983, p. 205-213) MP 1721 Modeling two-dimensional freezing. Albert, M.R., (1984, 45p.) Bridges Piles in permafrost for bridge foundations. Crory, F.E., et al., (1967, 41p.) Failure of an ice bridge. DenHartog, S.L., et al., (1976, 13p.) Ice breakup on the Chena River 1975 and 1976. CR 76-29 Ice breakup on the Chena River 1975 and 1976. MP 1134 Arching of model ice floes at bridge piers. Calkins, D.J., (1978, p.495-507) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1990, 17p.) CR 39-25
Oracle chasters in wet move. Cohook, S.C. (1996, 1944) Pamedicinal analytin of the problem of verticing fronts. Nakapan, Nat. 1, 1949, 1941-195, 1941-195, MP 1937 Water and all treatments for in process media. Nation, Y., (1990, p.124-135) Water and all treatments with and without phose change problems. O'Note, 12, (1981, p.124-135) Boundary unter problem of fow in process media. Nation, Y., (1990, p.124-135) Boundary unter problem of fow in process media. Nation, W. (1990, p.124-135) Boundary unter problem of fow in process media. Nation, W. (1990, p.124-135) Boundary unter problem of fow in process media. Nation, W. (1990, p.124-135) Boundary unter problem of fow in process media. Nation, W. (1991, p.124-135) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-137) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-137) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-137) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-137) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-137) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-137) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-137) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of fow in process media. Nation, W. (1994, p.124-19) Boundary unter problem of	or river ice cover thickness simu (1985, p.34-62) MP 286 seneous snow. Colbeck, S.C. MP 121: semodynamics of cold capillar (1981, 9p.) It lipid levels in Arctic plants (2, p.40-45) MP 137: the Arctic tundra. Coyne, P.I. MP 137: the Arctic tundra. Coyne, P.I. MP 137: the Arctic tundra. Coyne, P.I. MP 137: andra vegetation. Coyne, P.I. MP 137: madratization of carbon dioxid J., -t al., (1973, p.163-181) MP 181: mafrost to climatic warming Id., p.92-105, MP 137: concrete pavement. Kovacs, A. CR 83-1: It lipid levels in Arctic plants 2, p.40-45, MP 137: frost penetration beneath pave, (1976, 41p.) expedient roads. Smith, N., e CR 79-1: magratic plants J.M., (1976, 60p.) c buildings with urea-formalde 1, et al., [1977, p.478-487] MP 95: with cellular plastic insulation in recently construct at al., [1983, p.168-173] with cellular plastic insulation in recently construct at al., [1983, p.168-173]	lation. Shen, H.T., et al., [1985, p.54-d. Capfillarity Water flow through heterogeneous snov [1979, p.37-45] Introduction to the basic thermodynamic systems. Colbeck, S.C., [1981, 9p.] Zarbakyanates Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p.40-45] Zarbae diexthle Carbon dioxide dynamics on the Arctic tu et al., [1971, p.48-52] Carbon dioxide exchange in tundra vegets et al., [1972, p.36-39] Case for comparison and standardization reference gases. Kelley, J.J., et al., [19 CO2 effect on permafrost terrain. Brow 30p.] West antarctic sea ice. Ackley, S.F., [19 Potential responses of permafrost to Goodwin, C.W., et al., [1984, p.92-105] Detection of cavities under concrete paver et al., [1983, 41p.] Call merphelesy Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p.40-45] Cellular materials Influence of insulation upon frost penetra ments. Eaton, R.A., et al., [1976, 41p.] Cellular materials Influence of insulation for expedient ro al., [1979, 21p.] Cellular plantics Evaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., [1976, Reinsulating old wood frame buildings we	mporary environment. Cold regions habitability. Bechel, R.B., et al, [1976, 162p.] R.B., et al, [1976, 162p.] R. 76-10 R. 7	Orain clusters in wet snow. Colbeck, S.C., [1979, p.371-384] Pinctional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and sir horizontal flow in porous media. Nakano, Y., [1980, p.314-35] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Deforming finite elements with and without phase change. Lynch, D.R., et al., [1981, p.81-96] Boundary integral equation solution for phase change problems. O'Neill, K., [1983, p.125-1850] Boundary value problem of flow in porous media. Nakano, Y., (1983, p.205-213) Modeling two-dimensional freezing. Albert, M.R., [1984, 45p.] Philoses Piles in permafrost for bridge foundations. Crory, F.E., et al., (1967, 41p.) Pailure of an ice bridge. DenHartog, S.L., et al., [1976, 13p.] CR 76-29 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., (1977, 44p.) Arching of model ice floes at bridge piers. Calkins, D.J., (1978, p.495-507) Los forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al., (1980, 17p.) CR 78-25
384. R. 2 et al. (1971, 1972). BR 7-101 Pencel content analysis of the problem of vesting from the Nation of Markano, Y. MP 1945 Water and six borticostal flow in porous media. Nation. MP 1945 Water and six vestical flow through porous media. Nation. Of the National Problems of the contents with our without place change problems of flow in porous media. Nation. Development of the contents with our without place change problems of flow in porous media. Nation. Development of the contents with our without place change problems of flow in porous media. Nation. Problems of flow in porous media. Nation. Nation. Problems of flow in porous media. Nation. Problems of flow in porous media. Nation. Nation. Problems of the flow in porous media. Nation. Nation. Nation. Nation. Problems of the flow in porous media. Nation.	peneous snow. Colbeck, S.C. MP 121: rmodynamics of cold capillar 1981, 9p.] 1 lipid levels in Arctic plants 2, p.40-45, MP 137: the Arctic tundra. Coyne, P.I. MP 137: undra vegetation. Coyne, P.I. MP 137: mafrost of carbon dioxid J., ←t al., [1973, p.163-181] MP 158: mafrost to climatic warming MP 171: oncrete pavement. Kovacs, A. CR 83-1: 1 lipid levels in Arctic plants 2, p.40-45, MP 137: frost penetration beneath pave 1, [1976, 41p.] SR 76-0 expedient roads. Smith, N., e CR 79-1: me—puncture, stiffness, temper J.M., [1976, 60p.] e buildings with urea-formalde J., et al., [1977, p.478-487] MP 93: with cellular plastic insulation 22p.] insulation in recently construct tt al., [1983, p.168-173] me 1981, p.66-173 me 1983, p.168-173 me 1983, p.188-184 me 1983, p.188-184 me 1983, p.188-184 me 1983, p.188-184 me 1984, p.188-184	Captillarity Water flow through heterogeneous snov (1979, p.37-45) Introduction to the beaic thermodynamic systems. Colbeck, S.C., (1981, 9p.) Introduction to the beaic thermodynamic systems. Colbeck, S.C., (1981, 9p.) Introduction to the beaic thermodynamic systems. Colbeck, S.C., (1981, 9p.) Introduction to the heart systems and the systems distributed in Carbon dioxide dynamics on the Arctic tue et al., (1971, p.48-52) Carbon dioxide exchange in tundra vegets et al., (1972, p.36-39) Case for comparison and standardization reference gases. Kelley, J.J., et al., (19 CO2 effect on permafrost terrain. Brow 30p.) West antarctic sea ice. Ackley, S.F., (19 Potential responses of permafrost to Goodwin, C.W., et al., (1984, p.92-105) Envisation Detection of cavities under concrete paver et al., (1983, 41p.) Cellular materials Influence of insulation upon frost penetra ments. Eaton, R.A., et al., (1976, 41p. Sulfur form as insulation for expedient ro al., (1979, 21p.) Cellular materials Envaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	el, R.B., et al., [1976, 162p.] ergy conservation in buildings. Ledbetter, C.B., [1976, p.] mputer derived heat requirements for buildings in cold egions. Bennett, F.L., [1977, 113p.] sengineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 4p.] Amot, H.W.C., et al., [1977, 4p.] MP 939 rared thermography of buildings an annotated bibliography. Marshall, S.J., [1977, 21p.] idelines for architectural programming of office settings. SR 77-49 idelines for architectural programming of office settings. SR 77-49 idelines for architectural programming of office settings. SR 77-49 idelines for architectural programming of office settings. SR 77-49 idelines for architectural programming of office settings. SR 77-49 idelines for architectural programming of office settings. SR 77-49 insulating unmetered steam use with a condensate pump ycle counter. Johnson, P.R., [1977, p.434-442] MP 957 insulating old wood frame buildings with tree-formalde- ycle counter. Johnson, W., et al., [1977, p.478-487] MP 958 sete heat recovery for building heating. Sector, P.W., SR 77-7, 24p.] intatining buildings in the Arctic. Tobisseon, W., et al., 1977, 24p.] chitectural set defenter, C.B., [1977, 3p.] rared thermography of buildings. Munis, R.H., et al., 1977, 11p.] ared thermography of buildings. Munis, R.H., et al., 1977, 11p.] imporary protection of winter construction. Bennett, F.L., 1977, 21p., 1978, 7p., 1977, 21p., 1978, 7p.,	Panctional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-315] Water and sir horizontal flow in porous media. Nakano, Y., [1980, p.314-315] Water and sir vertical flow through porous media. Nakano, Y., [1980, p.124-133] Water and sir vertical flow through porous media. Nakano, Y., [1980, p.124-133] Deforming finite elements with and without phase change. Lynch, D.R., et al, [1981, p.81-96] Boundary integral equation solution for phase change problems. O'Neill, K., [1993, p.125-1850] Boundary value problem of flow in porous media. Nakano, Y., [1983, p.205-213] Modeling two-dimensional freezing. Albert, M.R., [1984, 45p.] Evidence of the problem of boundations. Crory, F.E., et al, [1967, 41p.] Failure of an ice bridge. DenHartog, S.L., et al, [1976, 41p.] Failure of an ice bridge. DenHartog, S.L., et al, [1976, 44p.] Arching of model ice floes at bridge piers. Calkins, D.J., (1978, p.495-507) Lee forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, [1979, 40p.) Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al, [1980, 17p.) CR 20-25
Passetional analysis of the problem of westing from: Nature 1, 1989, p.11-15, p.11-1	mp 121: mmodynamica of cold capillar- 1981, 9p.; SR 81-6- 1 lipid levels in Arctic plants 2, p.40-45; MP 137. the Arctic tundra. Coyne, P.I. MP 90. undra vegetation. Coyne, P.I. MP 137. mdardization of carbon dioxid J., +t al., [1973, p.163-181] MP 137. mdardization of carbon dioxid J., +t al., [1973, p.163-181] MP 134. dey, S.F., [1984, p.88-95] MP 134. dey, S.F., [1984, p.88-95] MP 134. oncrete pavement. Kovacs, A. CR 83-18 f lipid levels in Arctic plants 2, p.40-45; MP 137. frost penetration beneath pave 4, (1976, 41p.) expedient roads. Smith, N., e CR 79-1 J.M., (1976, 60p.) e buildings with ures-formalde 7, et al., [1983, p.168-173] with cellular plastic insulation SR 82-6* insulation in recently construct tt al., [1983, p.168-173] with cellular plastic insulation SR 82-6* insulation in recently construct tt al., [1983, p.168-173]	Water flow through heterogeneous snov (1979, p.37-45) Introduction to the basic thermodynamic systems. Colbock, S.C., (1981, 9p.) Carbanylarses. Colbock, S.C., (1981, 9p.) Carbanylarses. Trends in carbohydrate and lipid levels McCown, B.H., et al., (1972, p.40-45) Carban dioxide dynamics on the Arctic tu et al., (1971, p.48-52) Carbon dioxide exchange in tundra vegets et al., (1972, p.36-39) Case for comparison and standardization reference gases. Kelley, J.J., et al., (19 CO2 effect on permafrost terrain. Brow 30p.; West antarctic sea ice. Ackley, S.F., (19 Potential responses of permafrost to Goodwin, C.W., et al., (1984, p.92-105; Cavitation Detection of cavities under concrete paver et al., (1983, 41p.) Cellular masterials Influence of insulation upon frost penetra ments. Baton, R.A., et al., (1976, 41p. Sulfur form as insulation for expedient ro al., (1979, 21p.) Cellular plastics Evaluation of MESL membrane—punctura ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	ergy conservation in buildings. Ledbetter, C.B., [1976, p.] muter derived heat requirements for buildings in cold egions. Bennett, F.L., [1977, 113p.] SR 77-43 engineering facility heated with a central heat pump system. Aamot, H.W.C., et al. [1977, 4p.] MP 939 rared thermography of buildings: an annotated bibliography. Marshall, S.J., [1977, 21p.] sidelines for architectural programming of office settings. SR 77-45 sauring unmetered steam use with a condensate pump ycle counter. Johnson, P.R., [1977, p. 434-442] my 957 insulating old wood frame buildings with ures-formalde-yde foam. Tobiasson, W., et al., [1977, p. 478-487, p. 478-487] siste heat recovery for building heating. Sector, P.W., 977, 24p.; intuining buildings in the Arctic. Tobiasson, W., et al., 1977, p. 244-251; chitects and scientists in research for design of buildings in blasks. Ledbetter, C.B., [1977, 8p.; Tared thermography of buildings. Munis, R.H., et al., 1977, 21p.; provery protection of winter construction. Bennett, F.L., 987, 73-39 chitectural programming: Making socially responsive architectural programming: Making socially responsive architecture more accessible. Ledbetter, C.B., [1978, 7p.] 87 78-82 tezebue hospital—a case study. Croy, F.R., [1978, 7p.]	no, Y., [1980, p.314-315] MP 1347 Water and sir horizontal flow in porous media. Nakano, Y., [1980, p.81-45] MP 1341 Water and sir vertical flow through porous media. Nakano, Y., [1980, p.124-133] MP 1342 Deforming finite elements with and without phase change. Lynch, D.R., et al. [1981, p.81-96] MP 1343 Boundary integral equation solution for phase change problems. O'Neill, K., [1983, p.1825-1850] MP 2693 Boundary value problem of flow in porous media. Nakano, Y., [1983, p.205-213] MP 1721 Modeling two-dimensional freezing. Albert, M.R., [1984, 45p.] Bridges Piles in permafrost for bridge foundations. Crory, F.E., et al., [1967, 41p.] Failure of an ice bridge. DenHartog, S.L., et al., [1976, 13p.] Le breakup on the Chena River 1975 and 1976. CR 76-29 Le breakup on the Chena River 1975 and 1976. CR 77-14 Arching of model ice floes at bridge piers. Calkina, D.J., (1978, p.495-507) Lee forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.) Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al., [1980, 17p.) CR 38-25
Water and th Pericontal flow in porous models. Nakano, Y., 1979, 1	armodynamics of cold capillar 1981, 9p.; SR \$1-6 SR \$1	Introduction to the besic thermodynamic systems. Colbock, S.C., (1981, 9p.) 2 Treads in carbohydrate and lipid levels McCown, B.H., et al., (1972, p.40-45) 2 Treads in carbohydrate and lipid levels distributed by the color of the state of the color o	mouter derived heat requirements for buildings in cold agions. Bennett, F.L., (1977, 113p.) SR 77-83 engine findlity heated with a central heat pump system. Aamot, H.W.C., et al. (1977, 4p.) MP 939 traved thermography of buildings: an annotated bibliography. Marshall, S.J., (1977, 21p.) SR 77-85 sidelines for architectural programming of office settings. SR 77-89 sesuring unmetered steam use with a condensate pump yele counter. Johnson, P.R., (1977, p.434-442) MP 957 insulating old wood frame buildings with ures-formaldo-yele foam. Tobiasson, W., et al, (1977, p.478-487) MP 958 stee heat recovery for building heating. Sector, P.W., 1977, 24p.) tintaining buildings in the Arctic. Tobiasson, W., et al, 1977, p.244-251; MP 1566 chitects and scientists in research for design of buildings in the Arctic. Tobiasson, W., et al, 1977, 17p., 244-251; Aured thermography of buildings. Munis, R.H., et al, 1977, 17p.; arred thermography of buildings. Munis, R.H., et al, 1977, 21p.; mporary protection of winter construction. Bennett, F.L., 1977, 21p.; steptus hospital—a case study. Croy, F.R., [1978, 7p.) SR 77-82 tezebue hospital—a case study. Croy, F.R., [1978, 7p.]	Water and air horizontal flow in porous media. Nakano, Y., (1980, p.81-85) Water and air vertical flow through porous media. Nakano, Y., (1980, p.124-133) MP 1342 Deforming finite elements with and without phase change. Lynch, D.R., et al., (1981, p.81-96) Boundary integral equation solution for phase change problems. O'Neill, K., (1993, p.125-1850) Boundary value problem of flow in porous media. Nakano, Y., (1983, p.205-213) Modeling two-dimensional freezing. Albert, M.R., (1984, 45p.) Relages Piles in permafrost for bridge foundations. Crory, F.E., et al., (1967, 41p.) Failure of an ice bridge. DenHartog, S.L., et al., (1967, 41p.) Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., (1977, 44p.) Arching of model ice floes at bridge piers. Calkins, D.J., (1978, p.495-507) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al., (1980, 17p.) CR 29-25
Wister and air vertical flow through persons models. Nakano, 17, (1990, p.1914-1950). Deforming finite circulation with not without pleasing with control of the property of the change of the property of the	I lipid levels in Arctic plants 2, p.40-45] MP 137. the Arctic tundra. Coyne, P.I. MP 96. mndra vegetation. Coyne, P.I. MP 98. mndra vegetation. Coyne, P.I. MP 137. mdardization of carbon dioxid J., -t al., [1973, p.163-181] MP 137. deep, S.F., [1984, p.86-95] MP 181. deep, S.F., [1984, p.86-95] MP 181. mafrost to chimatic warming 14, p.92-105] MP 171. oncrete pavement. Kovaca, A. CR 83-1: dipid levels in Arctic plants 2, p.40-45; MP 137. frost penetration beneath pave, (1976, 41p.) SR 76-0 expedient roads. Smith, N., e. CR 79-1: me—puncture, stiffness, temper J.M., (1976, 60p.) c. buildings with urea-formalde, ., et al., [1977, p.478-487] MP 95. with cellular plastic insulation in recently construct st. al., [1983, p.168-173] insulation in recently construct st. al., [1983, p.168-173]	Carbahydrates Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p.40-45] Carbon dioxide dynamics on the Arctic tu et al., [1971, p.48-52] Carbon dioxide exchange in tundra vegets et al., [1972, p.36-39] Case for comparison and standardization reference gases. Kelley, J.J., et al., [19 CO2 effect on permafrost terrain. Brow 30p.] Potential responses of permafrost to Goodwin, C.W., et al., [1984, p.92-105] Invitation Detection of cavities under concrete paver et al., [1983, 41p.] Cellular materials Influence of insulation upon frost penetra ments. Eaton, R.A., et al., [1976, 41p. Sulfur foam as insulation for expedient ro al, (1979, 21p.) Cellular plantics Evaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	engineering facility heated with a central heat pump sys- engineering facility heated with a central heat pump sys- tered thermography of buildings: an annotated bibliogra- hy. Marshall, S.J., [1977, 21p.] idelines for architectural programming of office settings. schetter, C.B., [1977, 14p.] suring unmetered steam use with a condensate pump ycle counter. Johnson, P.R., [1977, p.434-442] MP 957 insulating old wood frame buildings with urea-formalde- yde foam. Tobiasson, W., et al., [1977, p.478-487] MP 958 set heat recovery for building heating. Sector, P.W., 1977, 24p.] intaining buildings in the Arctic. Tobiasson, W., et al., 1977, 244-251; chitects and scientists in research for design of buildings in blasks. Ledbetter, C.B., [1977, 5p.] tared thermography of buildings. Munis, R.H., et al., 1977, 17p.] rared thermography of buildings. Munis, R.H., et al., 1977, 17p.] sample of buildings. Munis, R.H., et al., 1977, 14p.] chitectural programming: Making socially responsive ar- hitecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 77-39 chitectural programming: Making socially responsive ar- hitecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 78-82 tzebue hospital—a case study. Croy, F.R., [1978, 7p.]	Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] MP 1342 Deforming finite elements with and without phase change. Lynch, D.R., et al., [1981, p.81-96] MP 1493 Boundary integral equation solution for phase change problems. O'Neill, K., [1983, p.1825-1850] MP 2693 Boundary value problems of flow in porous media. Nakano, Y., (1983, p.205-213) MP 1721 Modeling two-dimensional freezing. Albert, M.R., [1984, 45p.] CR 84-10 Bridges Price in permafrost for bridge foundations. Crory, F.E., et al., [1967, 41p.] Relives of an ice bridge. DenHartog, S.L., et al., [1976, 13p.] CR 76-29 Ice breakup on the Chena River 1975 and 1976. McPsadden, T., et al., [1977, 44p.] CR 77-14 Arching of model ice floes at bridge piers. Calkina, D.J., (1978, p.495-507) MP 1346 Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al., [1990, 17p.) CR 89-25
Determing finite alements with and without phase change. Typeb, D.R., et al. (1981, p. 205-21) Boundary rates problem of flow in porous modit. MB 1711 Modeling two-dimensional treating. Albert, M.R., (248-1) MB 1811 Modeling two-dimensional treating. Albert, M.R., (248-1) MB 1811 Modeling two-dimensional treating. Albert, M.R., (248-1) MB 1811	2, p.40-45] MP 137: the Arctic tundra. Coyne, P.I. MP 98: mundra vegetation. Coyne, P.I. MP 137: dey, S.F., [1984, p.88-95, MP 181: mafrost to climatic warming MP 171: mundra to climatic warming MP 137: foot penetration beneath pave, (1976, 41p.) SR 76-0 expedient roads. Smith, N., et al., [1976, 60p.] c buildings with ures-formalde formalde form	McCown, B.H., et al., [1972, p.40-45] Carbon dioxide dynamics on the Arctic tu et al., [1971, p.48-52] Carbon dioxide exchange in tundra vegets et al., [1972, p.36-39] Case for comparison and standardization reference gases. Kelley, J.J., et al., [19 CO2 effect on permafrost terrain. Brow 30p.; West antarctic sea ice. Ackley, S.F., [19 Potential responses of permafrost to Goodwin, C.W., et al., [1984, p.92-105] Cavitation Detection of cavities under concrete paver et al., [1983, 41p.] Cell merphology Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p.40-45] Cellular masterials Influence of insulation upon frost penetra ments. Eston, R.A., et al., [1976, 41p. Sulfur foam as insulation for expedient ro al., [1979, 21p.] Cellular planetics Evaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., [1976, Reinsulating old wood frame buildings w	rared thermography of buildings: an annotated bibliogra- hy. Marshall, S.J., [1977, 21p.] SR 77-85 satisfied for architectural programming of office settings, edbetter, C.B., [1977, 14p.] SR 77-85 saturing unnetered steam use with a condensate pump ycle counter. Johnson, P.R., [1977, p.434-442] Insulating old wood frame buildings with urea-formalde- lyde foam. Tobiasson, W., et al., [1977, p.478-487] SR 77-11 instaining buildings in the Arctic. Tobiasson, W., et al., [1977, 24p.] insulating buildings in the Arctic. Tobiasson, W., et al., [1977, p.244-251] CR 77-23 tared thermography of buildings. Munis, R.H., et al., [1977, 12p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 41p.] stered thermography of buildings. Munis, R.H., et al., [1977, 41p.] stered thermography of buildings. Munis, R.H., et al., [1977, 41p.] stered thermography of buildings. Munis, R.H., et al., [1977, 41p.] stered thermography of buildings. Munis, R.H., et al., [1977, 41p.] stered thermography of buildings. Munis, R.H., et al., [1977, 41p.] stered thermography of buildings. Munis, R.H., et al., [1977, 41p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered thermography of buildings. Munis, R.H., et al., [1977, 21p.] stered the	Deforming finite elements with and without phase change. Lynch, D.R., et al. [1981, p.81-96]. MP 1693 Boundary integral equation solution for phase change problems. O'Neill, K., [1983, p.1825-1850]. MP 2693 Boundary value problem of flow in porous media. Nakano, Y., [1984, p.205-213]. MP 1721 Modeling two-dimensional freezing. Albert, M.R., [1984, 45p.]. CR 84-10 Bridges Piles in permafrost for bridge foundations. Crory, F.B., et al., [1974, 41p.]. CR 76-29 Ice breakup on the Chena River 1975 and 1976. MP 1411 Failure of an ice bridge. DenHartog, S.L., et al., [1976, 13p.]. CR 76-29 Ice breakup on the Chena River 1975 and 1976. MP 1411 Arching of model ice floes at bridge piers. Calkins, D.J., (1978, p.495-507) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.]. MP 1304 Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al., [1980, 17p.). CR 88-25
Boundary integral equation solution for phase charge prob- lena. O'Rull X., [1933, 1912-1835) M 203 Boundary value problem of flow in porous media. Nature. Michael Str., [1935, 1912-1835] M 203 Boundary value problem of flow in porous media. Nature. Reference problem of flow in porous media. Nature. CR 84-10 Bridges Files permatront for bridge foundations. Croyr, E. 48-10 Bridges Files permatront for bridge foundations. Croyr, E. 48-10 Bridges Files permatront for bridge foundations. Croyr, E. 48-10 Bridges Files permatront for bridge foundations. Croyr, E. 48-10 Bridges Files permatront for bridge foundations. Croyr, E. 48-10 Bridges Files permatront for bridge foundations. Croyr, E. 48-10 Bridges Files permatront for bridge foundations. Croyr, E. 48-10 Bridges Files permatront for bridge foundations. Croyr, E. 48-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundations. Croyr, E. 49-10 Bridges Files permatront for bridge foundat	MP 94: madra vegetation. Coyne, P.I. MP 137: mdardization of carbon dioxid J., →t al., [1973, p.163-181] MP 96: rrain. Brown, J., et al., [1982, dey, S.F., [1984, p.88-95, MP 134: dey, S.F., [1984, p.88-95, MP 137: dey, S.F., [1984, p.88-95, MP 171: mafrost to climatic wramin MP 171: oncrete pavement. Kovacs, A. CR 83-1: d lipid levels in Arctic plants 2, p.40-45, MP 137: frost penetration beneath pave, (1976, 41p.) expedient roads. Smith, Nr. CR 79-1: me—puncture, stiffness, temper J.M., (1976, 60p.) c buildings with ures-formalde /, et al., [1977, p.478-487, with cellular plastic insulation SR 82-6' insulation in recently construct st al., [1983, p.168-173] st al., [1983, p.168-173]	Carbon dioxide dynamics on the Arctic tue et al., [1971, p.48-52, Carbon dioxide exchange in tundra vegets et al., [1972, p.36-39] Case for comparison and standardization reference gases. Kelley, J.J., et al., [19 CO2 effect on permafrost terrain. Brow 30p.; West antarctic sea ice. Ackley, S.F., [19 Potential responses of permafrost to Goodwin, C.W., et al., [1984, p.92-105] Carlottella and the season of	idelines for architectural programming of office settings. colbetter, C.B., [1977, 14p.] sauring unmetered steam use with a condensate pump ycle counter. Johnson, P.R., [1977, p.434-442] Insulating old wood frame buildings with ures-formalde- yde foam. Tobiasson, W., et al., [1977, p.478-487, MP 958 sate heat recovery for building heating. Sector, P.W., 977, 24p.] 1977, 24p.] 1977, 24p.] 1977, 2p., 244-251; 1018-251;	Boundary integral equation solution for phase change problems. O'Neill, K., (1983, p.1825-1850) MP 2093 Boundary value problem of flow in porous media. Nakano, Y., (1983, p.205-213) MP 1721 Modeling two-dimensional freezing. Albert, M.R., (1984, 45p.) CR 84-10 Bridges Piles in permafrost for bridge foundations. Crory, F.E., et al, (1967, 41p.) MP 1411 Failure of an ice bridge. DenHartog, S.L., et al, (1976, 13p.) CR 76-29 Ice breakup on the Chena River 1975 and 1976. MC 76-29 Ice breakup on the Chena River 1975 and 1976. MC 77-14 Arching of model ice floes at bridge piers. Calkina, D.J., (1978, p.495-507) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, (1979, 40p.) Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al, (1980, 17p.) CR 88-25
leas. O'Nell, K., 1987, p.1123-1135). MF 2093 Bounday value pointen of flow in procus media. John John John John John John John John	MP 94: madra vegetation. Coyne, P.I. MP 137: mdardization of carbon dioxid J., →t al., [1973, p.163-181] MP 96: rrain. Brown, J., et al., [1982, dey, S.F., [1984, p.88-95, MP 134: dey, S.F., [1984, p.88-95, MP 137: dey, S.F., [1984, p.88-95, MP 171: mafrost to climatic wramin MP 171: oncrete pavement. Kovacs, A. CR 83-1: d lipid levels in Arctic plants 2, p.40-45, MP 137: frost penetration beneath pave, (1976, 41p.) expedient roads. Smith, Nr. CR 79-1: me—puncture, stiffness, temper J.M., (1976, 60p.) c buildings with ures-formalde /, et al., [1977, p.478-487, with cellular plastic insulation SR 82-6' insulation in recently construct st al., [1983, p.168-173] st al., [1983, p.168-173]	et al., (1971, p.48-52) Carbon dioxide exchange in tundra vegeta et al., (1972, p.36-39) Case for comparison and standardization reference gases. Kelley, J.J., et al., (19 CO2 effect on permafrost terrain. Brow 30p.; West antarctic sea ice. Ackley, S.F., (19 Potential responses of permafrost to Goodwin, C.W., et al., (1984, p.92-105; Cavitation Detection of cavities under concrete paver et al., (1983, 41p.; Cell merphelegy Trends in carbohydrate and lipid levels McCown, B.H., et al., (1972, p.40-45; Cellular masterials Influence of insulation upon frost penetra ments. Eaton, R.A., et al., (1976, 41p.) Cellular plantics Evaluation of MESL membrane—punctum ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	assuring unmetered steam use with a condensate pump yele counter. Johnson, P.R., [1977, p.434-442] MIP 957 insulating old wood frame buildings with urea-formalde- yde foam. Tobiasson, W., et al., [1977, p.478-487] MIP 958 sete heat recovery for building heating. Sector, P.W., 1977, 24p.] intraining buildings in the Arctic. Tobiasson, W., et al., 1977, p.244-251, MAP 1566 chitects and scientists in research for design of buildings in theaks. Ledbetter, C.B., [1977, 8p.] Tared thermography of buildings. Munis, R.H., et al., 1977, 11p.] Tared thermography of buildings. Munis, R.H., et al., 1977, 21p.] Tared thermography of buildings. Munis, R.H., et al., 1977, 21p.] Sign 77-25 chitectural programming: Making socially responsive architecture more accessible. Ledbetter, C.B., [1978, 7p.] Sign 78-82 tesebue hospital—a case study. Croy, F.R., [1978, 7p.]	Boundary value problem of flow in porous media. Nakamo, Y., (1983, p.205-213) Modeling two-dimensional freezing. Albert, M.R., (1984, 45p.) Bridges Piles in permafrost for bridge foundations. Crory, F.E., et al, (1967, 41p.) Failure of an ice bridge. DenHartog, S.L., et al, (1976, 13p.) Le breakup on the Chena River 1975 and 1976. McFadden, T., et al, (1977, 44p.) Arching of model ice floes at bridge piers. Calkina, D.J., (1978, p.495-507) Lee forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, (1979, 40p.) Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al, (1980, 17p.) CR 28-25
cycle counter. Johnson, P.R., (1977, p.434-443) Mp. 957 Mp. 1981 Mp. 1971 Mp. 1982 Mp. 1982 Mp. 1983 Mp. 1972 Mp. 1984 Mp. 1973 Mp. 1984 Mp. 1985 M	MP 137: Indiardization of carbon dioxido J., et al., [1973, p.163-181) MP 95- Irain. Brown, J., et al., [1982, MP 154- Idey, S.F., [1984, p.88-95, MP 157- Idey, S.F., [1984, p.88-95, MP 157- Idey, S.F., [1984, p.88-95, MP 157- Idey, S.F., [1976, 60p.] Expedient roads. Smith, N., et al., [1977, p.478-487] Idey, S.F., [1978, p.478-487] Idex, S.F., [1978, p.478-4	et al. (1972, p.36-39) Case for comparison and standardization reference gases. Kelley, J.J., et al., (19 CO2 effect on permafrost terrain. Brow 30p.) West antarctic sea ice. Ackley, S.F., (19 Potential responses of permafrost to Goodwin, C.W., et al., (1984, p.92-105) Zavitation Detection of cavities under concrete paver et al., (1983, 41p.) Cell merghology Trends in carbohydrate and lipid levels McCown, B.H., et al., (1972, p.40-45) Zellaker materials Influence of insulation upon frost penetra ments. Baton, R.A., et al., (1976, 41p. Sulfur form as insulation for expedient ro al., (1979, 21p.) Cellular phaetics Evaluation of MESL membrane—puncturn ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	insulating old wood frame buildings with ures-formalde- lyde foam. Tobiasson, W., et al., [1977, p.478-487] MP 958 sete beat recovery for building heating. Sector, P.W., 1977, 24p.] initaining buildings in the Arctic. Tobiasson, W., et al., 1977, p.44-251; chitects and scientists in research for design of buildings in lasks. Ledbetter, C.B., [1977, 8p.] CR 77-23 rared thermography of buildings. Munis, R.H., et al., 1977, 17p.] rared thermography of buildings. Munis, R.H., et al., 1977, 17p.] mporary protection of winter construction. Bennett, F.L., 1977, 41p.; SR 77-39 chitectural programming: Making socially responsive ar- hitecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 78-82 kzebue hospital—a case study. Croy, F.R., [1978, 7p.]	Y., [1983, p.205-213] MP 1721 Modeling two-dimensional freezing. Albert, M.R., [1984, 45p.] CR 84-10 Bridges Piles in permafrost for bridge foundations. Crory, F.E., et al., [1967, 41p.] MP 1411 Failure of an ice bridge. DenHartog, S.L., et al., [1976, 13p.] CR 76-28 Lee breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] CR 77-14 Arching of model ice floos at bridge piers. CR 77-14 Arching of model ice floos at bridge piers. Calkina, D.J., (1978, p.495-507) MP 1134 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.] Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al., [1980, 17p.) CR 88-25
Plies premarkous for bridge foundations. Curry, M.P. et al., 1975, p. et al., 1976, p. 139; p. 139; p. 177, 249; p. 139; p. 139; p. 177, 249; p. 139; p. 139; p. 139; p. 177, 249; p. 139; p.	J., et al., [1973, p.163-181] MF 96 rrain. Brown, J., et al., [1982, MP 134- dey, S.F., [1984, p.86-95] mafrost to climatic warming 14, p.92-105] MP 171- oncrete pavement. Kovaca, A. CR 83-1: f lipid levels in Arctic plants 2, p.40-45; MP 137- frost penetration beneath pave 1, [1976, 41p.] Expedient roads. Smith, N., e. CR 79-1: an—puncture, stiffness, temper J.M., [1976, 60p.] Expedient roads. Smith, N., e. buildings with ures-formalde 1, et al., [1977, p.478-487] with cellular plastic insulation (22p.) insulation in recently construct 1 al., [1983, p.168-173] insulation in recently construct 1 al., [1983, p.168-173]	reference gases. Kelley, J.J., et al., [19] CO2 effect on permafrost terrain. Brow 30p.] West antarctic sea ice. Ackley, S.F., [19] Potential responses of permafrost of Goodwin, C.W., et al., [1984, p.92-105] Envitationa Detection of cavities under concrete paver et al., [1983, 41p.] Cell merghedegy Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p.40-45] Cellular materials Influence of insulation upon frost penetra ments. Baton, R.A., et al., [1976, 41p. Sulfur foam as insulation for expedient ro al., (1979, 21p.) Cellular plastics Evaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., [1976, Reinsulating old wood frame buildings w	yde foam. Tobiasson, W., et al., [1977, p.478-487] MP 958 sete heat recovery for building heating. Sector, P.W., SR 77-11 intraining buildings in the Arctic. Tobiasson, W., et al., 1977, p.244-251; chitects and acientists in research for design of buildings in CR 77-23 rared thermography of buildings. Munis, R.H., et al., 1977, 17p.; SR 77-26 rared thermography of buildings. Munis, R.H., et al., 1977, 12p.; mporary protection of winter construction. Bennett, F.L., 1977, 41p.; chitectural programming: Making socially responsive architecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 78-82 tzebue hospital—a case study. Crory, F.B., [1978,	45p.j CR 84-10 Bridges Piles in permafrost for bridge foundations. Crory, F.E., et al, [1967, 41p.] Raihure of an ice bridge. DenHartog, S.L., et al, [1976, 13p.] Ice breakup on the Chena River 1975 and 1976. McPadden, T., et al, [1977, 44p.] Arching of model ice floes at bridge piers. Calkins, D.J., [1978, p.495-507] Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, [1979, 40p.] Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al, [1980, 17p.) CR 88-25
Plies in permathrost for bridge Countations. Ctory, F.E., et al., [1974, 1971, 1971, 1972, 1973, 1974,	rrain. Brown, J., et al., 1982. MP 154 dey, S.F., [1984, p.88-95] MP 181 idey, S.F., [1984, p.88-95] MP 181 warming MP 171 oncrete pavement. Kovacs, A CR \$3-1 i lipid levels in Arctic plants 2, p.40-45] MP 137 frost penetration beneath pave 1, [1976, 41p.] Expedient roads. Smith, N., e CR 76-2 expedient roads. Smith, N., e CR 76-2 e buildings with ures-formalde 1, et al., [1977, p.478-487] MP 95 with cellular plastic insulation SR \$2-6' insulation in recently construct tt al., [1983, p.168-173]	CO2 effect on permafrost terrain. Brow 30p.; West antarctic sea ice. Ackley, S.F., [19] Potential responses of permafrost to Goodwin, C.W., et al., [1984, p.92-105] Evitationa Detection of cavities under concrete paves et al., [1983, 41p.] Cell merghology Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p.40-45] Cellular materials Influence of insulation upon frost penetra ments. Baton, R.A., et al., [1976, 41p.] Sulfur form as insulation for expedient ro al., [1979, 21p.] Cellular plantics Evaluation of MESL membrane—punctum ature, solvents. Sayward, J.M., [1976, Reinsulating old wood frame buildings w	MP 958 set best recovery for building heating. 1977, 24p.1 initaining buildings in the Arctic. Tobisson, W., et al., MP 1506 chitects and scientists in research for design of buildings in tlasks. Ledbetter, C.B., (1977, 5p.) tared thermography of buildings. Munis, R.H., et al., 1977, 17p.; rared thermography of buildings. Munis, R.H., et al., 1977, 1p.; pared thermography of buildings. Munis, R.H., et al., SR 77-29 rared thermography of buildings. Munis, R.H., et al., SR 77-29 the property protection of winter construction. Bennett, F.L., SR 77-39 chitectural programming: Making socially responsive architecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 78-82 tzebue hospital—a case study. Croy, F.R., [1978, 7p.]	Piles in permafrost for bridge foundations. Crory, F.E., et al., (1967, 41p.) MP 1411 Failure of an ice bridge. DenHartog, S.L., et al., (1976, 13p.) Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., (1977, 44p.) Arching of model ice floes at bridge piers. Calkins, D.J., (1978, p.495-507) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al., (1980, 17p.) CR 88-25
Febburs of as loc bridge. DenHartog, S.L., et al., 1976. 13p; loc breakup on the Chean River 1975 and 1976. 13p; loc breakup on the Chean River 1975 and 1976. 13p; loc breakup on the Chean River 1975 and 1976. 13p; loc bross on the Yukon River bridge piers. 13p; loc bross on the Yukon River Bridge piers. 13p; loc bross on the Yukon River Bridge piers. 13p; loc bridge piers.	dey, S.F., [1984, p.88-95] MP 181: mafrost to climatic warming M, p.92-105] MP 171: oncrete pavement. Kovacs, A. CR 83-1: I lipid levels in Arctic plants 2, p.40-45] MP 137: frost penetration beneath pave, (1976, 41p.) expedient roads. Smith, N., e CR 79-1: me—puncture, stiffness, temper J.M., (1976, 60p.) c buildings with urea-formalde 7, et al., [1977, p.478-487] MP 95: with cellular plastic insulation in recently construct at al., [1983, p.168-173]	West antarctic sea ice. Ackley, S.F., [19] Potential responses of permafrost to Goodwin, C.W., et al., [1984, p.92-105] Evitation Detection of cavities under concrete paver et al., [1983, 41p-] Cell merphology Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p.40-45] Cellular masterials Influence of insulation upon frost penetra ments. Baton, R.A., et al., (1976, 41p. Sulfur foam as insulation for expedient ro al., [1979, 21p.] Cellular plantics Evaluation of MESL membrane—punctum ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings we	1977, 24p.] straining buildings in the Arctic. Tobisson, W., et al., 1977, p.244-251; chitects and acientists in research for design of buildings in CR 77-23 rared thermography of buildings. Munis, R.H., et al., 1977, 17p.; strand thermography of buildings. Munis, R.H., et al., 1977, 11p.; mporary protection of winter construction. Bennett, F.L., 1977, 41p.; chitectural programming: Making socially responsive architecture more accessible. Ledbetter, C.B., [1978, 7p.] strand thermography of buildings. Munis, R.H., et al., 1977, 41p.; chitectural programming: Making socially responsive architecture more accessible. Ledbetter, C.B., [1978, 7p.] strand thermography of buildings. Making socially responsive architecture more accessible. Ledbetter, C.B., [1978, 7p.]	Failure of an ice bridge. DenHartog, S.L., et al, 11976, 139, 129 lice breakup on the Chena River 1975 and 1976. CR 76-29 lice breakup on the Chena River 1975 and 1976. McFadden, T., et al, 11977, 449-3 CR 77-14 Arching of model ice floes at bridge piers. Calkins, D.J., 11978, p.495-507, MP 1134 lice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, 11979, 409-3 MP 1304 Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al, 11980, 179-3 CR 88-25
13p1 13p3 13p3 12p3 13p3	mafrost to climatic warming MP 181: 4, p.92-105] MP 171: oncrete pavement. Kovacs, A. CR \$3-1: 4 lipid levels in Arctic plants 2, p.40-45] MP 137: frost penetration beneath pave (1976, 41p.) SR 76-0: expedient roads. Smith, N., e. CR 79-1: ne—puncture, stiffness, temper J.M., (1976, 60p.) c buildings with ures-formalde /., et al., [1977, p.478-487] MP 98: with cellular plastic insulation in recently construct at al., [1983, p.168-173]	Potential responses of permafrost to Goodwin, C.W., et al., [1984, p.92-105] avitation Detection of cavities under concrete paves et al., [1983, 41p.] Cell merghelogy Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p.40-45] Cellular materials Influence of insulation upon frost penetra ments. Baton, R.A., et al., (1976, 41p. Sulfur foam as insulation for expedient ro al., (1979, 21p.) Cellular plantics Evaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	1977, p.244-251; All 1966 chitects and acientists in research for design of buildings in Malkake. Ledhetter, C.B., [1977, 8p.] crawd thermography of buildings. Munis, R.H., et al., 1977, 17p.; arred thermography of buildings. Munis, R.H., et al., 1977, 21p.; mporary protection of winter construction. Bennett, F.L., 1977, 41p.; chitectural programming: Making socially responsive architecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 78-28 czebue hospital—a case study. Crory, F.E., [1978, [1978, 7p.]	Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] CR 77-14 Arching of model ice floss at bridge piers. Calkins, D.J., 1978, p.495-507] MR 1134 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.] MR 1304 Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al., [1980, 17p.] CR 38-25
T., et al. (1977, 44p.) Clarks, D.J., (1978, p.495-507) Le forces on the Yukon River bridge—1978 breaten, D. Abakak. Ledbetter, C.B., (1977, 198) Les forces on the Yukon River bridge—1978 breaten, D. Abakak. Ledbetter, C.B., (1977, 198) Les forces on the Yukon River bridge—1978 breaten, D. Abakak. Ledbetter, C.B., (1977, 198) Les forces on the Yukon River bridge—1978 breaten, D. Abakak. Ledbetter, C.B., (1977, 198) Les forces on the Yukon River bridge—1978 breaten, D. Abakak. Ledbetter, C.B., (1977, 198) Les forces measurement on the Yukon River bridge—1978 breaten on the Knimal Control River Bridge—1978 breaten on the Yukon River bridge—1978 breaten on the Yukon River bridge—1978 breaten on the Knimal River Bridge—1978 breaten bridge	14, p.92-105] MP 1710 oncrete pavement. Kovacs, A. CR \$3-10 t lipid levels in Arctic plants 2, p.40-45] MP 1370 frost penetration beneath pave, (1976, 41p.) SR 76-0 expedient roads. Smith, N., e CR 79-10 me—puncture, stiffness, temper J.M., (1976, 60p.) ce buildings with urea-formalde for, et al., [1977, p.478-487] MP 950 with cellular plastic insulation SR \$2-60 insulation in recently construct tt al., [1983, p.168-173]	Goodwin, C.W., et al. (1984, p.92-105) Detection of cavities under concrete paver et al. (1983, 41p-) Cell merphology Trends in carbohydrate and lipid levels McCown, B.H., et al. (1972, p.40-45) Cellular materials Influence of insulation upon frost penetra ments. Eston, R.A., et al. (1976, 41p. Sulfur foam as insulation for expedient ro al. (1979, 21p.) Cellular plantics Evaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	Makk. Ledbetter, C.B., [1977, 8p.] Arred thermography of buildings. Munis, R.H., et al. 1977, 17p.] Pared thermography of buildings. Munis, R.H., et al. 1977, 21p.] Emporary protection of winter construction. Bennett, F.L., 1977, 41p.] SR 77-39 chitectural programming: Making socially responsive ar- hitecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 78-82 Azebue hospital—a case study. Croy, F.B., [1978,	T., et al, 1977, 44p.; CR 77-14 Arching of model ice floes at bridge piers. Calkins, D.J., 1978, p.495-507; Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, 1979, 40p.; MP 1304 Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al, 1980, 17p.; CR 89-25
Les forces on the Yukon River bridge—1978 breakers. Johnson, P.R., et al., [1979, 179.] Single and double reaction beam load cells for measuring the forces. Johnson, P.R., et al., [1990, 179.] Single and soulded reaction beam load cells for measuring the forces. Johnson, P.R., et al., [1990, 179.] Single and soulded reaction beam load cells for measuring the forces. Johnson, P.R., et al., [1990, 179.] Single and soulded reaction beam load cells for measuring the forces. Johnson, P.R., et al., [1990, 179.] Single and soulded reaction beam load cells for measuring the forces. Johnson, P.R., et al., [1990, 179.] Single and soulded reaction beam load cells for measuring the forces. Johnson, P.R., et al., [1970, 1980, 199	CR \$3-16 I lipid levels in Arctic plants 2, p.40-45 MP 1376 frost penetration beneath pave, (1976, 41p.) Expedient roads. Smith, N., e CR 79-19 Ine—puncture, stiffness, temper J.M., (1976, 60p.) CR 76-2 buildings with ures-formalde 7, et al., [1977, p.478-487] with cellular plastic insulation in recently construct at al., [1983, p.168-173]	Detection of cavities under concrete paver et al. [1983, 41p.] cell merphology Trends in carbohydrate and lipid levels McCown, B.H., et al. [1972, p.40-45] cellular materials Influence of insulation upon frost penetra ments. Baton, R.A., et al. (1976, 41p.) cultur form as insulation for expedient ro al. (1979, 21p.) Cellular plantics Evaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings we	1977, 17p.; SR 77-29 rared thermography of buildings. Munis, R.H., et al., 1977, 21p.; SR 77-26 mporary protection of winter construction. Bennett, F.L., 1977, 41p.; Bennett, F.L., 1977, 41p.; Making socially responsive architectural programming: Making socially responsive architecture more accessible. Ledbetter, C.B., 1978, 7p.; SR 78-82 tzebue hospital—a case study. Crory, F.B., 1978,	(1978, p.495-507) MP 1134 loe forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, (1979, 40p.) MP 1304 Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al, (1980, 17p.) CR 88-25
son, P.R., et al., [1979, 40p.) MP 1394 Single and double reaction beam load cells for measuring tec forces. Johnson, P.R., et al., [1980, 17p.) CR 89-25 Lee force measurement on the Yukon River bridge. McPadden, T., et al., [1981, p.749-777) Mary 1395 Show and ice courted on ratificial and conciles in structures. Kato, K., et al., [1981, p.719-779] Rate Samuel and the string programming: Making socially recovered in carbodydrate and lipid in McCown, B.H., et al., [1972, p.40-618] Kotzebus hospital—a case study. Croy, P.E., [1978, ap. 1486-148] Lee forces on a bridge pier. Ottauquechee River, Yemnon's Sound, D.S., et al., [1983, 5p.) Bridge and control or ratification and conciles in structures. Kato, K., et al., [1983, 5p.) Bridge and control or ratification and conciles in tructures. Kato, K., et al., [1983, 5p.) Bridge and control or ratification and conciles and conciles and control or ratification of the Ross Ice Shelf. My et al., [1978, p.891-897] Construction on permattent al Longycentryon on Spittbergan. Tobiasson, W., (1978, p.891-897) Construction on permattent at Longycentryon on Spittbergan. Tobiasson, W., (1978, p.891-897) Subsurface measurements of McMurdo Ice Shelf. Kovacs, A., et al., [1980, 1-p.) Mp 1335 Sas ice anisotropy, electromagnetic reflection from sea ice. Golden, K.M., et al., [1980, 1-p.) San ice anisotropy, electromagnetic properties and strength. Kovacs, A., et al., [1980, 1-p.) McMurdo Ice Shelf brine zone. Kovacs, A., et al., [1982, 1-p.) Gallace properties and brine volumes in sea ice textures in sea ice textures. Co., G.F.N., et al., [1983, p.306-316, MP 2085] McMurdo Ice Shelf brine zone. Kovacs, A., et al., [1982, 1-p.) McMurdo Ice Shelf brine zone. Kovacs, A., et al., [1982, 1-p.) McMurdo Ice Shelf brine zone. Kovacs, A., et al., [1982, 1-p.) McMurdo Ice Shelf brine zone. Kovacs, A., et al., [1983, p.306-316, MP 2085] McMurdo Ice Shelf brine zone. Kovacs, A., et al., [1983, p.306-316, MP 2085] McMurdo Ice Shelf brine zone. Kovacs, A., et	t lipid levels in Arctic plants 2, p.40-45 MP 137. frost penetration beneath pave, (1976, 41p.) SR 76-0 expedient roads. Smith, N., e CR 79-1: me—puncture, stiffness, temper J.M., (1976, 60p.) CR 76-2 e buildings with urea-formalde, et al., (1977, p.478-487) MP 95: with cellular plastic insulation in recently construct at al., (1983, p.168-173)	Cell merphology Trends in carbohydrate and lipid levels McCown, B.H., et al., [1972, p. 40-45] Cellular materials Influence of insulation upon frost penetra ments. Eston, R.A., et al., [1976, 41p. Sulfur foam as insulation for expedient ro al., [1979, 21p.] Cellular plastics Evaluation of MESL membrane—punctum ature, solvents. Sayward, J.M., [1976, Reinsulating old wood frame buildings w	mporary protection of winter construction. Bennett, F.L., 1977, 41p.; SR 77-39 chitectural programming. Making socially responsive arhitecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 78-62 exebue hospital—a case study. Crory, F.E., [1978,	son, P.R., et al, [1979, 40p.] MP 1304 Single and double reaction beam load cells for measuring ice forces. Johnson, P.R., et al, [1980, 17p.] CR 38-25
Frances. Johnson, P.R., et al. [1990, 179-). Is of forces and pixel of the properties and special programming. Making socially response to the Yukon River bridge. MeP 1995. Show and the control on railroads, highways and all sports. Minds, L.D., et al. [1911, 1974-777) Is all possible of the properties and street programming. Making socially response to relative transfer and pixel properties. All possible properties and street. CR 83-32 p. 149-139. Show and the control on railroads, highways and all ports. Mark 1993, 359-140-140. Show the properties and street. CR 83-32 p. 149-139. Show and the control on railroads. CR 83-32 p. 149-139. Show and the control on railroads. CR 83-32 p. 149-139. Show the control on railroads. CR 83-32 p. 149-139. Show the control of the properties and strength. CR 83-32 p. 149-139. Show the control of the properties and strength. Kovaca, A., et al. [1981, 1972, 1984-1994] Sae ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al. [1992, 1984-1994] Modeling of anisotropy is electromagnetic properties and strength. Kovaca, A., et al	2, p.40-45] MP 1376 frost penetration beneath pave, (1976, 41p.) SR 76-9 expedient roads. Smith, N., e CR 79-1: me—puncture, stiffness, temper J.M., (1976, 60p.) CR 76-2 e buildings with ures-formalde f., et al., [1977, p.478-487, MP 93: with cellular plastic insulation SR 82-6 insulation in recently construct st al., [1983, p.168-173]	McCown, B.H., et al., [1972, p.40-45] Cellular materials Influence of insulation upon frost penetra ments. Eston, R.A., et al., (1976, 41p. Sulfur foam as insulation for expedient ro al, (1979, 21p.) Cellular plantics Evaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	mporary protection of winter construction. Bennett, F.L., 1977, 41p.; SR 77-39 chitectural programming: Making socially responsive architecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 78-82 tzebue hospital—a case study. Crory, F.R., [1978,	forces. Johnson, P.R., et al, [1980, 17p.] CR 88-25
her force measurement on the Yuton River bridge. MP 1984 notes. T. 1981, p.79-777) and airports. MP 1985 now and ice control on railroads, highways and airports. MP 1847 les action on pairs of cylindrical and conical structures. Kato, K., et al., (1935, p.59-1706) notes on a bridge piter, Ottauquechee River, Vermont. South, D.S., et al., (1935, p.59-1) notes on a bridge piter, Ottauquechee River, Vermont. South, D.S., et al., (1935, p.59-1) notes on a bridge piter, Ottauquechee River, Vermont. South, D.S., et al., (1937, p.59-1) notes on a bridge piter, Ottauquechee River, Vermont. South, D.S., et al., (1937, p.79-10) notes piter of the Rose loc Shelf, McMurdo Sound, Autarctica. Kovaca, A., et al., (1977, p. 146-148) notes of measurements of the McMurdo loc Shelf. Grow, A.J., et al., (1979, p. 79-80) MP 1338 Modeling of anisocropic electromagnetic reflection from sea ice. Golden, K.M., et al., (1980, p.247-294) notes one in the McMurdo loc Shelf, Antarctica. Kovaca, A., et al., (1980, p.247-294) notes one in the McMurdo loc Shelf, Antarctica. Kovaca, A., et al., (1980, p.247-294) notes one measurements of the Construction of the Shelf brine zone. Kovaca, A., et al., (1980, p.247-294) notes one material. S.J., (1980, 1979, 409-1) Required for the commander of the Rose of the McMurdo loc Shelf brine zone. Kovaca, A., et al., (1981, p.361-139) notes of determining the gas and brine volumes in sea ice amples. Co.d., G.F.N., et al., (1981, p.361-139) notes and prince on materials and the control of the Rose of the McMurdo loc Shelf brine zone. Kovaca, A., et al., (1981, p.361-306) notes of the McMurdo loc Shelf brine zone. Kovaca, A., et al., (1981, p.361-319) notes and brine volumes in sea ice amples. Co.d., G.F.N., et al., (1981, p.361-319) notes and brine volumes in sea ice amples. Co.d., G.F.N., et al., (1981, p.361-319) notes and brine volumes in sea ice amples. Co.d., G.F.N., et al., (1981, p.361-319) notes and brine volumes in sea ice amples. Co.d., G.F.N., et al., (1981, p.361-319) notes and prince of the Mc	n, (1976, 41p.) SR 76-0 expedient roads. Smith, N., e CR 79-1: me—puncture, stiffness, temper J.M., (1976, 60p.) CR 76-2 e buildings with ures-formalde /, et al., [1977, p.478-487, MP 93: with cellular plastic insulation SR 82-6 insulation in recently construct tt al., [1983, p.168-173]	Influence of insulation upon frost penetra ments. Baton, R.A., et al., (1976, 41p. Sulfur form as insulation for expedient ro al, (1979, 21p.) Cellular plantics Evaluation of MESL membrane—punctur ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	chitectural programming. Making socially responsive ar- hitecture more accessible. Ledbetter, C.B., [1978, 7p.] SR 78-62 ezebue hospital—a case study. Crory, F.E., [1978,	Ice force measurement on the Yukon Diver heides McPed.
Minak, L.D., et al., [1987, p.517-106] Ice scrion on pairs of cylindrical and conical structures, CR 83-25 Ice forces on a bridge pier, Ottauquechee River, Vermont. Sodha, D.S., et al., [1935, p.50] Sodha, D.S., et al., [1935, p.50] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al., [1977, p.146-148] MP 103 Subsurface measurements of McMurdo Ice Shelf. Gow. A.J., et al., (1979, p.79-80) Modeling of anisotropic electromagnetic properties and strength. Kovaca, A., et al., (1979, p.79-80) Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1980, 1987, p.891-897] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1982, p.191-105] Ses ice anisotropy, e	n, (1976, 41p.) SR 76-0 expedient roads. Smith, N., e CR 79-1: me—puncture, stiffness, temper J.M., (1976, 60p.) CR 76-2 e buildings with ures-formalde /, et al., [1977, p.478-487, MP 93: with cellular plastic insulation SR 82-6 insulation in recently construct tt al., [1983, p.168-173]	ments. Eaton, R.A., et al, (1976, 41p. Sulfur foam as insulation for expedient ro al, (1979, 21p.) Cellular plastics Evaluation of MESL membrane—puncturs ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w	SR 78-62 tzebue hospital—a case study. Crory, F.E., [1978,	
Les forces on a bridge pier, Ottauquechee River, Vermont. Sodhi, D.S., et al., [1983, 6p.] Refuse Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al., [1977, p.146-148], MP 1013 Subsurface measurements of McMurdo les Shelf, Gow, A., et al., [1979, p.79-940] Modeling of anisotropic electromagnetic reflection from sea ice. Golden, K.M., et al., [1980, p.79-940] Sea ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1980, p.18p.) Shie Shelf brine zone. Kovaca, A., et al., [1982, 11p.] General Constitutions of permanents of the McMurdo les Shelf, Gow, A., et al., [1980, p.18p.) Sea ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1980, p.18p.) Shie Shelf brine zone. Kovaca, A., et al., [1982, 11p.] General Constitutions of permanents of the months of the strength of the months of the months of the strength. Constitutions of permanents of the months of th	CR 79-1: ne—puncture, stiffness, temper J.M., (1976, 60p.) c buildings with urea-formable /, et al, [1977, p.478-487] MP 95: with cellular plastic insulation 22p.) SR 82-6* it al, [1983, p.168-173]	al, (1979, 21p.) Cellular plantics Evaluation of MESL membrane—puncturs ature, solvents. Sayward, J.M., (1976, Reinsulating old wood frame buildings w		
Defines on a bridge pier. Ottauquechee River, Vermont. Sodhi, D.S., et al., [1983, 6p.] Sodhi, D.S., et al., [1983, 6p.] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al., [1977, p.146-149] Subsurface measurements of McMurdo Ice Shelf. Oov, A.J., et al., (1979, p.19-80), MZ 1338 MRP 1338 MRP 1338 Sea ice anisotropy, electromagnetic reflection from sea ice. Golden, K.M., et al., (1980, p.247-294) MRP 1325 Sea ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., [1980, 18p.) Royaca, A., et al., [1980, 18p	J.M., (1976, 60p.) CR 76-2 buildings with urea-formalde 7, et al., [1977, p.478-487] MP 95 with cellular plastic insulation 22p.) SR 82-6 insulation in recently construct et al., [1983, p.168-173]	Evaluation of MESL membrane—punctum ature, solventa. Sayward, J.M., (1976, Reinsulating old wood frame buildings w		Ice action on pairs of cylindrical and conical structures.
Subsurface measurements of the Ross loc Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al., (1977, p.146-148) mp 1013 Subsurface measurements of McMurdo Ice Shelf. Gow, A.J., et al., (1979, p.79-80). MP 1335 Modeling of saisocropic electromagnetic reflection from sea ice. Golden, K.M., et al., (1980, p.247-294) MP 1325 Sea ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., (1980, p.247-294) MP 1325 Sea ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., (1980, p.247-294) MP 1325 Sea ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., (1980, p.247-294) Mr 1325 Sea ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., (1980, p.247-294) Mr 1325 Royations for determining the gas and brine volumes in sea ice seamples. Cox, G.F.N., et al., (1982, p.166-171) Royations for determining gas and brine volumes in sea ice. Seamples. Cox, G.F.N., et al., (1982, p.166-171) Royations for determining gas and brine volumes in sea ice. Seamples. Cox, G.F.N., et al., (1982, p.166-171) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1982, p.166-171) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1982, p.166-171) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1982, p.166-171) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1982, p.169-1) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1982, p.169-1) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1980, 369-1) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1982, p.169-1) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1982, p.169-1) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1982, p.169-1) Royations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1984,	CR 76-2: c buildings with ures-formalde f., et al., [1977, p.478-487] MP 95: with cellular plastic insulation f. 22p.] insulation in recently construct st al., [1983, p.168-173]	Reinsulating old wood frame buildings w	V., et al, [1978, p.891-897] MP 1109	Ice forces on a bridge pier, Ottauquechee River, Vermont.
Sound, Antarctica. Kovaca, A., et al. (1977, pl.146-148) Mpl 1013 Subsurface measurements of McMurdo Ice Shelf. Gow. A.J., et al., (1979, p.79-80) MP 1338 Modeling of anisocropic electromagnetic reflection from sea ice. Golden, K.M., et al., (1980, p.247-294) MP 1325 Sea ice anisotropy, electromagnetic properties and strength. Kovaca, A., et al., (1980, p.267-294) MP 1325 Bquations for determining the gas and brine volumes in sea ice samples. Coz., G.F.N., et al., (1982, 11p.) CR 82-39 Rquations for determining gas and brine volumes in sea ice. Cox., G.F.N., et al., (1982, 11p.) CR 82-39 Rquations for determining gas and brine volumes in sea ice. Cox., G.F.N., et al., (1983, p.306-316) MP 2059 Horizontal salinity variations in sea ice. Cox., G.F.N., et al., (1983, p.306-316) MP 2059 Short continuous monitoring of total dissolved gasea, a feasibility study. Jenkina, T.F., (1975, p.101-105) MP 205 Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al., (1984, 13p.) Deteriorated concrete panels on building. R-values measurement. Similar proformance of the USCGC Katmai Bay icebreaker. Vance, G.P., (1980, 28p.) CR 9-15 MP 205 Short drink bubbles. Cragin, J.H., (1985, p.71) Shabbles Shabbles Shabbles Shabbles Subshikes	7., et al. [1977, p.478-487] MP 95: with cellular plastic installer, 22p.; SR 82-6' insulation in recently construct et al. [1983, p.168-173]			Brines
Subsurface measurements of McMurdo Ice Shelf, Gow, A.J., et al., (1979, p.79-80) MP 1325 Modeling of anisotropic electromagnetic reflection from sea ice. Golden, K.M., et al., (1980, p.247-294) MP 1325 Sea ice anisotropy, electromagnetic properties and strength. Kovacs, A., et al., (1980, p.247-294) Brise zone in the McMurdo Ice Shelf, Antarctica. Kovaca, A., et al., (1982, p.166-171) MP 1325 Regustions for determining the gas and brine volumes in sea ice. Samples. Cox, G.F.N., et al., (1982, 11p.) CR 82-30 McMurdo Ice Shelf brine zone. Kovaca, A., et al., (1982, 11p.) Regustions for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., (1983, p.305-316) Horizontal salinity variations in sea ice. Tucker, W.B., et al., (1984, 15p.) Horizontal salinity variations in sea ice. Tucker, W.B., et al., (1984, 15p.) Ligst, Sp. (1983, p.306-316) MP 2025 Horizontal salinity variations of sea ice. Kovaca, A., et al., (1984, 15p.) Ligst, Sp. (1983, p.306-316) MP 2025 Horizontal salinity variations of sea ice. Kovaca, A., et al., (1984, 15p.) Ligst, Sp. (1983, p.306-316) MP 2025 Horizontal salinity variations of sea ice. Kovaca, A., et al., (1984, 15p.) Ligst, Sp. (1983, p.306-316) MP 2025 Horizontal salinity variations of sea ice. Kovaca, A., et al., (1984, 15p.) Ligst, Sp. (1983, p.306-316) MP 2025 Horizontal salinity variations of sea ice. Kovaca, A., et al., (1984, 15p.) Ligst, Sp. (1983, p.306-316) MP 2025 Horizontal salinity variations of sea ice. Kovaca, A., et al., (1983, p.306-316) MP 2025 Horizontal salinity variations of sea ice. Kovaca, A., et al., (1983, p.306-316) MP 2025 Horizontal salinity variations of sea ice. Kovaca, A., et al., (1984, 15p.) Ligst, Sp. (1984, 15p.	with cellular plastic insulation, 22p.; SR 82-8 insulation in recently construct at al., [1983, p.168-173]	myoc rount. 100-000, 11., 01 m; [12.		Sound, Antarctica. Kovaca, A., et al, [1977, p.146-148]
A.J., et al., [1979, 9.79-80] Modeling of sanisotropic electromagnetic reflection from sea ice. Golden, K.M., et al., [1980, 19.2) Sea ice anisotropy, electromagnetic properties and strength. Kowacs, A., et al., [1980, 18.5) CR 80-20 Brine zone in the McMurdo Ice Shelf, Antarctica. Kowacs, A., et al., [1980, 18.5) Guations for determining the gas and brine volumes in sea ice samples. Cox, G.F.N., et al., [1982, 119.] CR 82-39 McMurdo Ice Shelf brine zone. Kowacs, A., et al., [1982, 119.] Guations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., [1983, 306-316] MrJ 289-1 Guations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., [1983, 306-316] MrJ 299-8 Guations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., [1984, 1985, 18.7] Guations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., [1984, 1985, 319-] Guations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., [1984, 1985, 188-94] MrJ 2029 MrJ 289-1 Guations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., [1984, 1985, 188-94] MrJ 280-9 Guations for determining gas and brine volumes in sea ice. Tucker, W.B., et al., [1984, 1985, 188-94] MrJ 1761 Electromagnetic measurements of sea ice. Evosca, A., et al., [1984, 1985, 188-94] MrJ 2029 Bubblies Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., [1975, p.101-105, MrJ 281] Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al., [1984, 1985, 189-) Point source bubbler systems to suppress ice. Ashton, G.D., CR 79-12 Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] CR 29-19 Subbling MrJ 138 MrJ	, 22p.) SR 82-6 insulation in recently construct at al, [1983, p.168-173]	Moisture detection in roofs with cellular	rared thermography of buildings—a bibliography with ab-	Subsurface measurements of McMurdo Ice Shelf. Cow,
Sea ice anisotropy, electromagnetic properties and strength. Kovacs, A., et al. (1980, 18p.) Sea ice anisotropy, electromagnetic properties and strength. Kovacs, A., et al. (1980, 18p.) Brine zone in the McMurdo loc Shelf, Antarctica. Kovacs, A., et al. (1982, p.166-171) MP 1359 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 11p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) CR 82-39 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1982, 12p.) Mp 1362 Least life-cycle costs for insulation in Alaska. Flanders, S.N., et al. (1984, 13p.) CR 82-47 Coward in-situ building R-values measurement. Planders, S.N., et al. (1984, 13p.) Deteriorated concrete panels on building ant Sondrestrom, CR 82-12 McMurdo loc Shelf brine zone. Kovacs, A., et al. (1984, 13p.) CR 82-39 Mp 1381 CR 82-39 Mp 1382 Least life-cycle costs for insulation in Alaska. Flanders, S.N., et al. (1986, 33p.) CR 82-27 Constinuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., (1975, p.101-105) Mp 2015 Mp 2015 Mp 2015 Mp 2017 Mp	st al, [1983, p.168-173]	Korhonen, C., et al, [1982, 22p.]	rared thermography of buildings: 1977 Coast Guard sur-	
Sea ice anisotropy, electromagnetic properties and strength. Kovecs, A., et al. [1980, 18p.) Brine zone in the McMurdo Ice Shelf, Antarctica. Kovacs, A., et al. [1982, p. 166-171] Brine zone in the McMurdo Ice Shelf, Antarctica. Kovacs, A., et al. [1982, p. 166-171] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] CR 82-36 McMurdo Ice Shelf brine zone. Kovacs, A., et al. [1982, 11p.] Requisions for determining gas and brine volumes in sea ice. Cox, G.F.N., et al. [1983, p. 137-138] Mr 2055 Horizontal salinity variations in sea ice. Tucker, W.B., et al. [1981, p. 137-138] Eleast life-cycle costs for insulation in Alaska. S.N., et al. [1982, 47p.] Toward in-aith building R-value measurement. SR 88-04 MF 1766 Electromagnetic measurements of sea ice. Kovacs, A., et al. [1984, 13p.] Case studies. Planders, S.N. [1985, 36p.] CR 82-27 Toward in-aith building nater cold climates and on profit on permafrost. [1900, 57p.] CR 82-27 Toward in-aith building material distribution in Alaska. S.N., et al. [1980, 57p.] CR 82-27 Toward in-aith building material distribution in Alaska. S.N., et al. [1981, p. 137-138] Eleast life-cycle costs for insulation in Alaska. S.N., et al. [1984, 13p.] CR 82-27 Toward in-aith building R-value measurement. SR 84-01 Daylon Specifical developments of building envelopes. Ressured and concrete panel		ed roofs. Korhonen, C., et al, [1983,]	at occupancy evaluation of a planned community in Arctic	ice. Golden, K.M., et al, (1980, p.247-294)
Brine zone in the McMurdo Ice Shelf, Antarctica. MP 1555 A, et al, [1982, p.166-171] Multiple gas and brine volumes in sea ice samples. Cox, G.F.N., et al, [1982, 11p.] CR 2-30 McMurdo Ice Shelf brine zone. Kovaca, A., et al, [1982, 12p.] McMurdo Ice Shelf brine zone. Kovaca, A., et al, [1982, 23p.] McMurdo Ice Shelf brine zone. Kovaca, A., et al, [1982, 23p.] Aguations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al, [1983, p.306-316] MP 2655 Horizontal salinity variations in sea ice. Tucker, W.B., et al, [1980, 36p.] Blobbies Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., [1975, p.101-105] MP 267 Babbles Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., [1975, p.101-105] MP 267 Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] CR 29-12 Babbles MP 1766 MP 1766 MP 1766 MP 277 Measuring building R-values for communities in bot or cold regions. Bechtel, R.B., et al, [1980, 57p.] SR 80-29 U.SSoviet seminar on building under cold climates and on permander, J. [1980, 26p.] SR 80-40 MP 280-5			of leaks in cold regions: school at Chevak, Alaska.	
Equations for determining the gas and brine volumes in sea ice samples. Cox, G.F.N., et al., [1982, 11p.] CR 82-30 McMurdo Ice Shelf brine zone. Kovaca, A., et al., [1982, CR 82-39] Equations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., [1983, p.306-316] MP 2055 Horizontal salinity variations in sea ice. Tucker, W.B. et al., [1981, p.137-138] Electromagnetic measurements of sea ice. Kovaca, A., et al., [1984, 13p.] Ilectromagnetic measurements of sea ice. Kovaca, A., et al., [1984, 13p.] Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al., [1981, 1985, 199.] Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al., [1981, 1985, 199.] Greniand. Korhonen, C., [1984, 11p.] MP 2017 Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] Soft drink bubbles. Cragin, J.H., [1985, p.71] MP 1736 Babbling Equations for determining the gas and brine volumes in sea ice. CR 82-39 CR 82-30 McMurdo Ice Shelf brine zone. Kovaca, A., et al., [1982, 47p.] MP 2055 Horizontal salinity variations in sea ice. Tucker, W.B. et al., [1981, 1982, 47p.] MP 2017 Toward in-situ building R-value measurement. CR 82-27 Toward in-situ building R-value measurement. SR 82-27 Toward in-situ building R-value measurement. CR 82-27 MP 2017 MP 2017 MP 2017 MP 2017 Structure data bases for predicting building material distribution in NE 2017 Measured and expected R-values of 19 building envelopes nine stein, G.E., et al., [1976, 54p.] Investigation of ice clogged channels Investigation of ice clogged cha	CR 89-0	[1980, 55p.]	ne constraints on measuring building R-values. Flanders,	Brine zone in the McMurdo Ice Shelf, Antarctica. Kovaca,
McMurdo Ice Shelf brine zone. Kovaca, A., et al., 1982, 28p.; CR 82-39 Bquations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., 1983, p.306-316; MP 2055 Horizontal salinity variations in sea ice. Tucker, W.B., et al., 1984, p.6505-6514; MP 1761 Electromagnetic measurements of sea ice. Kovaca, A., et al., 1986, p.67-93; MP 2020 Bubbles Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., 1975, p.101-105; MP 851 Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al., 1987, p.75101-5108; MP 287 Point source bubbler systems to suppress ice. Ashton, O.D., (1979, 12p.) CR 79-12 Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., (1980, 28p.) CR 80-08 Soft drink bubbles. Cragin, J.H., (1985, p.71) MP 1736 Bubbling U.SSoviet seminar on building under cold climates and on permafrost. [1980, 15p.] SR 80-40 U.SSoviet seminar on building under cold climates and on permafrost. [1980, 19p.] U.SSoviet seminar on building under cold climates and on permafrost. [1980, 19p.] U.SSoviet seminar on building under cold climates and on permafrost. [1980, 19p.] U.SSoviet seminar on building under cold climates and on permafrost. [1980, 19p.] U.SSoviet seminar on building under cold climates and on permafrost. [1980, 19p.] MP 2020 U.SSoviet seminar on building under cold climates and on permafrost. [1980, 19p.] CR 20-27 Toward in-situ building R-value measurement. CR 84-01 S.N., et al., [1982, 47p.] Toward in-situ building R-value measurement. CR 84-01 S.N., et al., [1981, p.137-138] MP 2020 MP 2020 MP 2020 MP 2020 MP 2020 MP 2030 Greenland. Korhonen, C., [1984, 11p.] SR 84-12 Measuring building R-values for insulation in Alaska. Flanders, S.N., et al., [1985, 35p.] SR 85-07 East life-cycle costs for insulation in Alaska. Flanders, S.N., et al., [1985, 35p.] SR 85-07 Doint source bubbler systems to suppress ice. Ashton, O.D., (R 79-12 Deteriorated concrete penels on building envi lopes nine case studies. Flanders, S.N.	te in cold regions. Johnson, R.	Cements for structural concrete in cold reg	at occupancy evaluation for communities in hot or cold	Equations for determining the gas and brine volumes in sea
Reparations for determining gas and brine volumes in sea ice. Cox, G.F.N., et al., [1983, p.306-316] MP 2085 Horizontal salinity variations in sea ice. Tucker, W.B., et al., [1981, p.6505-6514] Electromagnetic measurements of sea ice. Kovaca, A., et al., [1982, 47p.] Electromagnetic measurements of sea ice. Kovaca, A., et al., [1982, 47p.] Electromagnetic measurements of sea ice. Kovaca, A., et al., [1982, 47p.] Electromagnetic measurements of sea ice. Kovaca, A., et al., [1982, 47p.] Electromagnetic measurements of sea ice. Kovaca, A., et al., [1982, 47p.] Electromagnetic measurements of sea ice. Kovaca, A., et al., [1982, 47p.] Electromagnetic measurements of sea ice. Kovaca, A., et al., [1984, 13p.] Eceriorated building R-values for large areas. Flanders, S.N., ER 25-27 Events of the control of the co	SR 77-3 ents for construction in the cold	(1977, 13p.) Resins and non-portland cements for const	SSoviet seminar on building under cold climates and on	CR 82-30
Bountions for determining gas and brine volumes in sea ice. Cox. G.F.N., et al., [1984, p.6505-6514] MP 1761 Electromagnetic measurements of sea ice. Kovacs, A., et al., [1986, p.679-93] Bubbles Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., [1975, p.101-105] MP 2020 Bubbles Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., [1975, p.101-105] MP 851 Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al., [1984, 1984] Representation of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] CR 79-12 Performance of the USCGC Katmai Bay icebreaker. CR 80-08 Soft drink bubbles. Cragin, J.H., [1985, p.71] MP 1736 Bubbling et al., [1981, p.137-138] Etast life-cycle costs for insulation in Alaska. Flanders, S.N., et al., [1984, 13p.] CR 82-27 Toward in-situ building, R-value measurement. Flanders, S.N., et al., [1984, 13p.] CR 84-01 Deteriorated concrete panels on buildings at Sondreatrom, Greenland. Korhonen, C., [1984, 11p.] Greenland. Korhonen, C., [1985, 35p.] CR 85-07 Structure data bases for predicting building material distribution. MP 2017 Foint source bubbler systems to suppress ice. CR 79-12 Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] CR 80-08 Soft drink bubbles. Cragin, J.H., [1985, p.71] MP 1736 Bubbling et al., [1981, p.137-138] East life-cycle costs for insulation in Alaska. Flanders, S.N., et al., [1984, 13p.] CR 82-27 Toward in-situ building R-value measurement. Flanders, S.N., et al., [1984, 13p.] CR 80-01 Bubbling et al., [1984, 13p.] CR 80-02 Bubbling et al., [1982, 47p.] CR 82-07 Deteriorated concrete panels on buildings at Sondreatrom, Greenland. Korhonen, C., [1985, 35p.] CR 85-07 Structure data bases for predicting building material distribution in NE concentrate of the programment of building ganels at Sondreatrom, Greenland. Korhonen, C., [1985, 50p.] East lif	SR 80-3: naterials: Part 2—Regulated-se			28p. _] CR 82-39
[1984, p.6503-6514] MP 1761 Electromagnetic measurements of sea ice. Kovaca, A., et al., [1986, p.67-93] MP 2020 Bubbles Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., [1975, p.101-105] MP 851 Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al., [1976, 1985, 1910-105] MP 857 Point source bubbler systems to suppress ice. Ashton, O.D., [1979, 12p.] CR 79-12 Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] CR 80-08 Soft drink bubbles. Cragin, J.H., [1985, p.71] MP 1736 Bubbling Toward in-situ building R-value measurement. Flanders, CR 84-08 S.N., [1984, 13p.] SR 94-12 Messuring thermal performance of building at Sondrestrom, Greenland. Korhonen, C., [1984, 11p.] SR 84-12 Messuring thermal performance of building material distribution. Merry, C.J., et al., [1985, 35p.] CR 85-07 Structure data bases for predicting building material distribution. Merry, C.J., et al., [1985, 35p.] SR 85-07 Deteriorated building panels at Sondrestrom, Greenland. Korhonen, C., [1984, 11p.] SR 84-12 Messuring thermal performance of building material distribution. Merry, C.J., et al., [1985, 35p.] SR 85-07 Structure data bases for predicting building material distribution. Merry, C.J., et al., [1985, 35p.] SR 85-07 MP 2017			t al, [1981, p.137-138] MP 1388	
Electromagnetic measurements of sea ice. Kovacs, A., et al, [1986, p.67-93] MP 2020 Babbles Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., (1975, p.101-105) MP 251 Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al, [1975, p.5101-5108] MP 267 Point source bubbler systems to suppress ice. Ashtoo, G.D., (1979, 12p.) CR 79-12 Performance of the USCGC Ksitmai Bay icebreaker. Vance, G.P., (1980, 28p.) CR 80-08 Soft drink bubbles. Cragin, J.H., (1985, p.71) MP 1736 Sabbling S.N., et al, [1984, 13p.) CR 84-12 Measuring thermal performance of building env. lopes: nine case studies. Flanders, S.N., (1985, 36p.) CR 85-07 Structure data bases for predicting building material distribution. Merry, C.J., et al, [1985, 35p.) SR 85-07 Structure data bases for predicting building material distribution. MP 2017 Measuring thermal performance of building env. lopes: nine structure data bases for predicting building material distribution. MP 2017 Messured and expected R-values of 19 building envelopes. CR 80-08 Soft drink bubbles. Cragin, J.H., (1985, p.71) MP 1736 MP 1736 Subbling S.N., et al, [1984, 13p.) CR 84-12 Measuring thermal performance of building env. lopes: nine case studies. Flanders, S.N., (1985, 36p.) CR 85-07 Structure data bases for predicting building material distribution in NR 2017 Measured and expected R-values of 19 building envelopes. MP 2017 Messured data bases for predicting building material distribution in NR 2017 Measured data chemical distribution in NR 2017 Messured data chemical distribution in NR 2017 Messured and expected R-values of 19 building envelopes. Planders, S.N., (1985, 50p.) SR 85-24 Cables (ropes) Soft drink bubbles. Cragin, J.H., (1985, 73p.) MP 2115 Models for predicting building material distribution in NR 2017 Messured data chemical distribution in NR 2017 Messured sat Sondrestrom, Greenland. CR 83-07 Messured and expected R-values of 19 building envelopes. NR 20-07 Messured data chemical distribution in NR	MP 146		S.N., et al, [1982, 47p.] CR 82-27	Horizontal salinity variations in sea ice. Tucker, W.B., et al. [1984, p.6505-6514] MP 1761
Bubbles Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., (1975, p.101-105) MP 851 Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al., (1975, p.5101-5108) MP 847 Point source bubbler systems to suppress ice. Ashton, O.D., (1979, 12p.) Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., (1980, 28p.) CR 80-08 Soft drink bubbles. Cragin, J.H., (1985, p.71) MP 1736 Bubbling Greenland. Korhonen, C., (1984, 11p.) SR 84-12 Meassuring thermal performance of building envilopes nine are studies. Flanders, S.N., (1985, 35p.) CR 85-07 Structure data bases for predicting building material distribution. Merry, C.J., et al., (1976, p.02/13-22) Loc removal from the walls of navigation of water jeta for lock deasuring thermal performance of building material distribution. MER 47-07 Structure data bases for predicting building material distribution. MP 2017 Merry, C.J., et al., (1985, 50p.) MP 2017 Measured and expected R-values of 19 building envelopes. Flanders, S.N., (1985, 50p.) MP 2115 Models for predicting building material distribution in NB 2017 Measured and expected R-values of 19 building envelopes. Flanders, S.N., (1985, 50p.) MP 2017 Measured attacks, S.P., 101, 102-103, MP 2017 Measured attacks, S.P., 102-103, MP 2017 Measured attacks, S.P., 102-103, MP 2017 Measured attacks, S.P., 102-103, MP 2017 Mercondary, S.P., 102-103, MP 2017 Measured attacks, S.P., 102-103, MP 2017 Mercondary, S.P., 102-103, MP 2017 Measured attacks, S.P., 102-103, MP 2017 Mercondary, S.P., 102-103, MP 2017 Measured attacks, S.P., 102-103, MP 20	channel design in cold regions CR 76-0.	Bibliography on harbor and channel desi	i.N., et al, [1984, 13p.] CR 84-01	Electromagnetic measurements of sea ice. Kovacs, A., et al,
Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al., [1975, p.5101-5108] MP 847 Point source bubbler systems to suppress ice. Ashton, O.D., [1979, 12p.] Performance of the USCGC Katmai Bay icebreaker. CR.P12 Soft drink bubbles. Cragin, J.H., [1985, p.71] MP 1736 Babbling Structure data bases for predicting building material distribution. BR 85-07 Deteriorated building panels at Sondrestrom, Greenland. RP 2017 Mersured and expected R-values of 19 building envelopes. Planders, S.N., [1985, p.49-57] Messured and expected R-values of 19 building envelopes. Planders, S.N., [1985, p.49-57] Models for predicting building material distribution. MP 2017 Mercured ata bases for predicting building material distribution. BR 85-07 Deteriorated building panels at Sondrestrom, Greenland. RP 2017 Messured and expected R-values of 19 building envelopes. Planders, S.N., [1985, p.49-57] Models for predicting building material distribution. BR 85-07 Deteriorated building panels at Sondrestrom, Greenland. RP 2017 Messured and expected R-values of 19 building envelopes. Planders, S.N., [1985, p.49-57] Models for predicting building material distribution. BR 85-07 Deteriorated building panels at Sondrestrom, Greenland. RP 2017 Messured and expected R-values of 19 building envelopes. Planders, S.N., [1985, p.49-57] Models for predicting building material distribution. BR 85-07 Deteriorated building panels at Sondrestrom, Greenland. RP 2017 Messured and expected R-values of 19 building envelopes. Planders, S.N., [1985, p.49-57] Messured and expected R-values of 19 building envelopes. Planders, S.N., [1985, p.49-57] Models for predicting building material distribution. BR 85-07 Deteriorated building material distribution. BR 85-07 Deteriorated building panels at Sondrestrom, Greenland. RP 2017 Mercured Panels at Sondrestrom, Greenland. RP 2017 Messured and expected R-values of 19 building envelopes. Research and expected R-values of 19 building envelopes. Research and expected R-values of 19 building envelopes. Research and	or lock wall deicing. Calkins	Investigation of water jets for lock wall	Greenland. Korhonen, C., [1984, 11p.] SR 84-12	Bubbles
[1975, p.5101-5108] MP 847 Point source bubbler systems to suppress ice. Ashton, O.D., CR 99-12 Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] CR 80-08 Soft drink bubbles. Cragin, J.H., [1985, p.71] MP 1736 Bubbling tion. Merry, C.J., et al., [1985, 35p.] SR 85-07 Deteriorated building panels at Sondrestrom, Greenland. Korhonen, C., [1985, p.71-0] MP 2017 Measured and expected R-values of 19 building envelopes. MP 2115 Models for predicting building material distribution in NE cities. Merry, C.J., et al., [1985, 50p.] SR 85-07 Deteriorated building panels at Sondrestrom, Greenland. Works. Mock, S.J., [1976, 54p.] Ice arching and the drift of pack ice to nels. Sodhi, D.S., [1977, 11p.] Models for predicting building material distribution in NE cities. Merry, C.J., et al., [1985, 50p.] SR 85-07 Deteriorated building panels at Sondrestrom, Greenland. Mock, S.J., [1976, 54p.] Ice arching and the drift of pack ice to nels. Sodhi, D.S., [1977, 11p.] Lock wall deicing studies. Hanamot Merry, C.J., et al., [1985, 50p.] Cables (ropes)	of navigation locks. Franken	lee removal from the walls of navigation	ase studies. Planders, S.N., [1985, 36p.] CR 85-07	
[1979, 12p.] CR 79-12 Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] CR 80-08 Soft drink bubbles. Cragin, J.H., [1985, p.71] MP 1736 Babbling Korhonen, C., [1985, p.7-10, MP 2017 Measured and expected R-values of 19 building envelopes. Planders, S.N., [1985, p.49-57] MP 2115 Models for predicting building material distribution in NR international critics. Merry, C.J., et al., [1985, 50p.] Soft drink bubbles. Cragin, J.H., [1985, p.71] MP 1736 Korhonen, C., [1985, p.7-10, MP 2017 Measured and expected R-values of 19 building envelopes. Planders, S.N., [1985, p.49-57] Models for predicting building material distribution in NR international critics. Merry, C.J., et al., [1985, p.49-57] Babbling	me treliis pattern channel net	stein, G.E., et al, t1976, p.1487-1496; Topological properties of some trellis pa	ion. Merry, C.J., et al, [1985, 35p.] SR 85-67	[1975, p.5101-5108] MP 847
Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] CR 80-08 Soft drink bubbles. Cragin, J.H., [1985, p.71] MP 1736 Measured and expected R-values of 19 building envelopes. MP 2115 Models for predicting building material distribution in NR cities. Merry, C.J., et al., [1985, 50p.] SER 85-24 Investigation of ice clogged channels Mellor, M., et al., [1978, 73p.]			teriorated building panels at Sondrestrom, Greenland. Korhonen, C., [1985, p.7-10] MP 2017	
Soft drink bubbles. Cragin, J.H., [1985, p.71] Models for predicting building material distribution in NE cities. Merry, C.J., et al., [1985, 50p.] Bubbling MP 1736 Cables (ropes) Models for predicting building material distribution in NE cities. Merry, C.J., et al., [1985, 50p.] Investigation of ice clogged channels Mellor, M., et al., [1978, 73p.]	11p.j CR 77-1	nels. Sodhi, D.S., (1977, 11p.)		
Bubbling Cables (ropes) Mellor, M., et al. [1978, 73p.]			odels for predicting building material distribution in NE	Soft drink bubbles. Cragin, J.H., (1985, p.71)
riperty, p.765-778, MP 936 shedding. Govoni J.W., et al. [1986, 8p. + figs.] h D.S., et al. [1978, 481, 1986, 8p. + figs.]	3p. ₎ MP 117	Mellor, M., et al, [1978, 73p.]	les (ropes)	Bubbling
MP 2180	5-432 ₁ MP 113	hi, D.S., et al, [1978, p.415-432]	nductor twisting resistance effects on ice build-up and ice hedding. Govoni, J.W., et al, [1986, 8p. + figs.] MP 2100	[1977, p.765-778] MP 936
(1978, p.231-238) MP 1618 Calorimeters mont. Gatto, L.W., (1978, 52p.)	8, 52p. ₁ CR 78-2		rimeters	(1978, p.231-238) MP 1618
(1978, p.362-366) MP 1160 (1982, p.133-138) MP 1996 F.D., et al., (1979, 5p.)	CR 79-1		1982, p.133-138 ₁ MP 1986	(1978, p.362-366) MP 1160
Point source bubbler systems to suppress ice. Ashton, G.D., [1979, p.93-100] Towing ships through ice-clogged of Physical and structural characteristics of sea ice in McMurdo kedging. Mellor, M., [1979, 21p.]	ogged channels by warping an 79, 21p.; CR 79-2	Towing ships through ice-clogged channel		
lce control at navigation locks. Hanamoto, B., 1981, Sound. Gow, A.J., et al., 1981, p.94-951 MP 1542 Clearing ice-clogged shipping chi		kedging. Mellor, M., r1979, 21p.,		
Performance of a point source bubbler under thick ice Labrador Bifects of ice on coal movement vis		Clearing ice-clogged shipping channel		
Melting ice with air bubblers. Carey, K.L., [1983, 11p.] et al., [1976, P.677-685] MP 883 Sediment load and channel characteri	ment via the inland waterway:	Clearing ice-clogged shipping channel [1980, 13p.] Effects of ice on coal movement via the	nda uhrador	p.1088-1095; MP 1448 Performance of a point source bubbler under thick ice.
	1, 72p. ₁ SR 81-1 haracteristics in subarctic uplan	Clearing ice-clogged shipping channel (1980, 13p.) Effects of ice on coal movement via the Lunardini, V.J., et al. (1981, 72p.) Sediment load and channel characteristics	nde shrader eneration of runoff from subarctic snowpacks. Dunne, T., MP 883	p.1088-1095 ₁ MP 1448 Performance of a point source bubbler under thick ice. Haynes, F.D., et al, [1982, p.111-124 ₁ MP 1529
	1, 72p.; SR 81-1 haracteristics in subarctic uplan l.W., et al, {1981, p.39-48; MP 151	Clearing ice-clogged shipping channel (1980, 13p.) Reflects of ice on coal movement via the Lunardini, V.J., et al., [1981, 72p.] Sediment load and channel characteristics catchments. Slaughter, C.W., et al., [1	nde shrador mercition of runoff from subarctic snowpacks. Dunne, T., t al., (1976, P.677-685) NIP 883 orthwest Territories—Mackenzie River piam research needs. Gerard, R., (1984, p.181-193)	p. 1088-1095, Performance of a point source bubbler under thick ice. Haynes, P.D., et al., (1982, p.111-124) MP 1529 Melting ice with air bubblers. Carey, K.L., (1983, 11p., TD 83-01 Bubblers and pumps for melting ice. Ashton, G.D., (1986,
p.223-2347 MP 2133 MP 1813 River ice suppression by side channe Building codes — Saint Lewrence River ter. Ashton, G.D., (1982, p.65-80	1, 72p. ₁ SR 81-1 haracteristics in subarctic uplan k.W., et al, {1981, p.39-48; MP 151 c channel discharge of warm w , p.65-80; MP 152	Clearing ice-clogged shipping channel (1980, 13p.) Effects of ice on coal movement via the Lunardini, V.J., et al. (1981, 72p.) Sediment load and channel characteristics	nde sheader sheader sheader sheater sheater st al. (1976, P.677-685) Orthwest Territories—Mackenzie River s jam research needs. Gerard, R., (1984, p.181-193) MP 1813 dast Lewrence River	p. 1088-1095; MP 1448 Performance of a point source bubbler under thick ice. Haynes, F.D., et al., (1982, p.111-124) MP 1529 Melting ice with air bubblers. Carey, K.L., (1983, i 1p., TD 83-01 Bubblers and pumps for melting ice. Ashton, G.D., (1986, p.223-234) Bullding codes

Chemach (waterways) (count.)	Building materials and acid precipitation. Merry, C.J., et al., 1985, 40p.; SR 85-61	CO2 effect on permafrost terrain. Brown, J., et al, (1982, 30p.)
Application of HEC-2 for ice-covered waterways. Calkins, D.J., et al, (1982, p.241-248) MP 1875	Structure data bases for prediciting building material distribu-	West antarctic ses ice. Ackley, S.F., [1984, p.88-95]
Effect of vessel size on shorelines along the Great Lakes chan-	tion. Merry, C.J., et al. [1985, 35p.] SR 85-07	MP 1816 Potential responses of permafrost to climatic warming
neis. Wuebben, J.L., [1983, 62p.] SR \$3-11 Application of a block copolymer solution to ice-prone struc-	Acidity of snow and its reduction by alkaline aerosols. Kumai, M., [1985, p.92-94] MIP 2006	Goodwin, C.W., et al, [1984, p.92-105] MP 1710
tures. Hanamoto, B., (1983, p.155-158) MP 1636	Description of the building materials data base for New	Role of sea ice dynamics in modeling CO2 increases. Hibler W.D., III, [1984, p.238-253] MP 1749
Methods of ice control. Frankenstein, G.E., et al., 1983, p.204-215, MP 1642	Haven, Connecticut. Merry, C.J., et al, [1985, 129p.] SR 85-19	Climatic factors
Bank recession and channel changes of the Tanana River,	Chemical reactions	Roofs in cold regions. Tobiasson, W., [1980, 21p.]
Alaska. Gatto, L.W., et al, [1984, 98p.] MP 1747 Modeling rapidly varied flow in tailwaters. Ferrick, M.G., et	Ice fog suppression using monomolecular films. McFadden, T., [1977, p.361-367] MP 956	U.SSoviet seminar on building under cold climates and or
al, [1984, p.271-289] MP 1711	UV radiational effects on: Martian regolith water. Nadeau,	permafrost. [1980, 365p.] SR 90-46
Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al, 1984,	P.H., (1977, 89p.) MP 1072 Second progress report on oil spilled on permafrost. McFad-	Tundra and analogous soils. Everett, K.R., et al. [1981, p.139-179] MP 1465
28p.) SR 84-85	den, T., et al, [1977, 46p.] SR 77-44	Introduction to abiotic components in tundrs. Brown, J.
Use of remote sensing for the U.S. Army Corps of Engineers dredging program. McKim, H.L., et al, [1985, p.1141-	Increasing the effectiveness of soil compaction at below-freezing temperatures. Hass, W.M., et al., [1978, 58p.]	[1981, p.79] MP 1432 Climatic factors in cold regions surface conditions. Bilello
1150 ₁ MP 1890	SR 78-25	M.A., (1985, p.508-517) MP 1961
Sub-ice channels and frazil bars, Tanana River, Alaska. Lawson, D.E., et al, [1986, p.465-474] MP 2129	Ice fog suppression using thin chemical films. McFadden, T., et al, {1979, 44p.} MP 1192	Climatelegy
Laboratory study of flow in an ice-covered sand bed channel.	Grouting silt and sand at low temperatures—a laboratory	Surface temperature data for Atkasook, Alaska summer 1975 Haugen, R.K., et al, [1976, 25p.] SR 76-01
Wuebben, J.L., [1986, p.3-14] MP 2123 Charge transfer	investigation. Johnson, R., [1979, 33p.] CR 79-05	Environmental analyses in the Kootenai River region, Mon-
Possibility of anomalous relaxation due to the charged dislo-	National Chinese Conference on Permafrost, 2nd, 1981.	tana. McKim, H.L., et al, [1976, 53p.] SR 76-13 Study of climatic elements occurring concurrently. Bilello
cation process. Itagski, K., [1983, p.4261-4264] MP 1669	Brown, J., et al, [1982, 58p.] SR 82-03	M.A., (1976, p.23-30) MP 1613
Charts	Bibliography on glaciers and permafrost, China, 1938-1979. Shen, J., ed, [1982, 44p.] SR 82-20	Soil characteristics and climatology during wastewater ap plication at CRRBL. Iskandar, I.K., et al, [1979, 82p.]
Geoecological mapping scheme for Alaskan coastal tundra.	U.S. permafrost delegation visit to China, July 1984. Brown,	SR 79-23
Everett, K.R., et al, [1978, p.359-365] MP 1098 Chemical analysis	J., _{ 1985, 137p. ₃ SR 85-09 Chukchi See	International Workshop on the Seasonal Sea Ice Zone, Mon- terey, California, Feb. 26-Mar.1, 1979. Andersen, B.G.
Report on ice fall from clear sky in Georgia October 26, 1959.	Subsea permafrost distribution on the Alaskan shelf. Sell-	ed, [1980, 357p.] MP 1292
Harrison, L.P., et al, (1960, 31p. plus photographs) MP 1017	mann, P.V., et al, [1984, p.75-82] MIP 1852	Cloud seeding
Salinity variations in sea ice. Cox, G.F.N., et al, [1974,	Civil engineering Role of research in developing surface protection measures	Compressed air seeding of supercooled fog. Hicks, J.R. [1976, 9p.] SR 76-01
p.109-122 ₁ MP 1023	for the Arctic Slope of Alaska. Johnson, P.R., [1978,	Laboratory studies of compressed air seeding of supercooled
Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1976, 4p.] CR 76-24	p.202-205; MP 1968 Classifications	fog. Hicks, J.R., et al, [1977, 19p.] SR 77-12 Clouds (meteorology)
Treatment of primary sewage effluent by rapid infiltration.	Proposed size classification for the texture of frozen earth	Polarization of skylight, Bohren, C., r1984, p.261-2651
Satterwhite, M.B., et al., [1976, 15p., CR 76-49 Composition of vapors evolved from military TNT. Leggett,	materials. McGaw, R., [1975, 10p.] MP 921	MP 1794
D.C., et al, [1977, 25p.] SR 77-16	Topological properties of some trellis pattern channel networks. Mock, S.J., [1976, 54p.] CR 76-46	Coal Effects of ice on coal movement via the inland waterways
Atmospheric trace metals and sulfate in the Greenland Ice Sheet. Herron, M.M., et al, [1977, p.915-920]	Icebergs: an overview. Kovacs, A., [1979, 7p.]	Lunardini, V.J., et al, [1981, 72p.] SR 81-13
MP 949	SR 79-21 Frost susceptibility of soil; review of index tests. Chamber-	Coastal topographic features Coastal marine geology of the Beaufort, Chukchi and Bering
Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1977, p.98-102] MP 1892	lain, E.J., [1982, 110p.] MIP 1557	Seas. Gatto, L.W., [1980, 357p.] SR 80-01
Dating annual layers of Greenland ice. Langway, C.C., Jr.,	Clay minerals Composition and structure of South Pole anow crystals.	Shore ice pile-up and ride-up: field observations, models
et al, [1977, p.302-306] MP 1094 Delineation and engineering characteristics of permafrost	Kumai, M., [1976, p.833-841] MP 853	theoretical analyses. Kovacs, A., et al, [1980, p.209- 298] MP 1299
beneath the Beaufort Sea. Seilmann, P.V., et al, [1977,	Applications of thermal analysis to cold regions. Sterrett,	Cohecion
	V D _1074 = 147 101-	
p.432-440 ₃ MCP 1077	K.F., [1976, p.167-181] MP 890 Water vapor adsorption by sodium montmorillonite at -5C.	Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-1:
p.432-440; MP 1077 Chemical composition of haul road dust and vegetation. Is- kandar, f.K., et al, [1978, p.110-111; MP 1116	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., [1978, p.638-644] MP 981	SR 79-11
p.432-440) Chemical composition of haul road dust and vegetation. Is-kandar, I.K., et al., [1978, p.110-111] MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska.	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells	SR 79-11 Cold storage Polar ice-core storage facility. Langway, C.C., Jr., (1976,
p.432-440) MP 1077 Chemical composition of haul road dust and vegetation. In- kandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al. [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed., [1978, 131p.] SR 78-13	SR 79-11
p.432-440) MP 1077 Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] CR 79-03	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., 11978, p.638-6441 MP 981 Cier sells Ecological baseline on the Alaskan haul road. 1978, 131p., Overconsolidated sediments in the Besufort Sea. Chamber-	SR 79-1: Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 874 Cold telerance Aquatic plant growth in relation to temperature and unfrozen
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al. [1978, p.110-111] MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al. [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al. [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al.	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, [1978, 131p.] Overconsolidated sediments in the Besufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen	SR 79-1: Cold storage Polar ice-core storage facility. Langway, C.C., Jr., (1976, p.71-75) MP 874 Cold telerance
p.432-440) Chemical composition of haul road dust and vegetation. Is-kandar, I.K., et al., [1978, p.110-111] MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., 11978, p.638-6441 MP 981 Clay selfs Ecological baseline on the Alaskan haul road. (1978, 131p.) Overconsolidated sediments in the Besufort Sca. Chamberlain, E.J., (1978, p.24-29) Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., (1979, 14p.) CR 79-28	Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 876 Cold telerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al, [1984, 8p.] CR 84-16
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] CR 79-03 Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, 44p.] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, [1978, 131p.] Overconsolidated sediments in the Besufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen	SR 79-1: Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87c Cold telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cold wanther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776]
p.432-440) Chemical composition of haul road dust and vegetation. Is-kandar, I.K., et al., [1978, p.110-111] MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. [1978, 131p.] Overconsolidated sediments in the Besufort Sca. Lain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] CR 79-28 Overconsolidation effects of ground freezing. E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear temperature	Cald storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 876 Cald telerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cald weather construction Life-cycle cost effectiveness of modular megastructures cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 893
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111; MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.; SR 78-14 Blank corrections for ultratrace stomic absorption analysis. Cragin, J.H., et al., [1979, 5p.; CR 79-03 Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.; CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow.	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., (1978, p.638-644) MP 981 Clay selfs Boological baseline on the Alaskan haul road. (1978, 131p.) Overcomosloidated sediments in the Besufort Sea. Lain, E.J., (1978, p.24-29) MP 1255 Blectron microscope investigations of frozen and unfrozen bentonite. Kumai, M., (1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. E.J., (1980, p.325-337) Water migration in frozen clay under linear temperature gradients. Xu, X., et al., (1985, p.111-122) MP 1934	Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 874 Cold telerance Aquatic plant growth in relation to temperature and unfrozes water content. Palazzo, A.J., et al, [1984, 8p.] Cold weather construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al, [1976, p.760-776] MP 895 Computer derived heat requirements for buildings in cole
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] CR 79-03 Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81) MP 1541 Chemical obscurant tests during winter: Environmental fate.	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. SR 78-13 Overconsolidated sediments in the Beaufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] Water migration in frozen clay under linear temperature gradients. Xu, X., et al., [1985, p.111-122] MP 1934 Experimental study on factors affecting water migration in frozen morin clay. Xu, X., et al., [1985, p.123-128]	Cald storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 876 Cald telerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cald weather construction Life-cycle cost effectiveness of modular megastructures is cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 897. Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] Observation and analysis of protected membrane roofing sys
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111; MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1766	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., [1978, p.638-644] MP 981 Clay sells Boological baseline on the Alaskan haul road. [1978, 131p.] Overcomosolidated sediments in the Besufort Sea. Lamberlain, B.J., [1978, p.24-29] Blectron microscope investigations of frozen and unfrozen bentonite. Kumasi, M., [1979, 14p.] Overconsolidation effects of ground freezing. Chamberlain, B.J., [1980, p.325-337] Water migration in frozen clay under linear temperature gradients. Xu, X., et al., [1985, p.111-122] Baperimental study on factors affecting water migration in frozen morin clay. Xu, X., et al., [1985, p.123-128] MF 1897	Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold tolerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cold weather construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89. Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-6; Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-11
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] CR 79-03 Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81) MP 1541 Chemical obscurant tests during winter: Environmental fate.	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., (1978, p.638-644) MP 981 Clay sells Ecological baseline on the Alaskan haul road. SR 78-13 Overcomoslidated sediments in the Besufort Sea. Lain, E.J., (1978, p.24-29) Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., (1979, 14p.) CR 79-28 Overcomoslidation effects of ground freezing. Chamberlain, E.J., (1980, p.325-337) MP 1934 Experimental study on factors affecting water migration in frozen clay under linear temperature gradients. Xu, X., et al., (1985, p.111-122) MP 1934 Experimental study on factors affecting water migration in frozen morin clay. Xu, X., et al., (1985, p.123-128) MP 1934 Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al., (1986, p.1014) MP 1970	Cald storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 876 Cald telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald weather construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.76-776] MP 893 Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-21
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1766 Nitrogen behavior in soils irrigated with liquid waste. Selim, H.M., et al., [1984, p.96-108] MP 1765 Snow chemistry of obscurants released during SNOW-	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., (1978, p.638-644) MP 981 Clay selfs Boological baseline on the Alaskan haul road. (1978, 131p.) SR 78-13 Overconsolidated sediments in the Besufort Sea. Lamberlain, B.J., (1978, p.24-29) MP 1255 Blectron microscope investigations of frozen and unfrozen bentonite. Kumasi, M., (1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. E.J., (1980, p.325-337) Water migration in frozen clay under linear temperature gradients. Xu, X., et al., (1985, p.111-122) MP 1934 Bxperimental study on factors affecting water migration in frozen morin clay. Xu, X., et al., (1985, p.123-128) Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al., (1986, p.1014) MP 1970 Clars	SR 79-1: Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87-Cold tolerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cold weather construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wag, L.RL., et al., [1976, p.760-776] MP 89: Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] Mid-winter installation of protected membrane roofs in Alas
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutta, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272, MP 1762 Nitrogen behavior in soils irrigated with liquid waste. Selim, H.M., et al., [1984, p.96-108] MP 1762	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., (1978, p.638-644) MP 981 Clay sells Ecological baseline on the Alaskan haul road. SR 78-13 Overcomoslidated sediments in the Besufort Sea. Lain, E.J., (1978, p.24-29) Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., (1979, 14p.) CR 79-28 Overcomoslidation effects of ground freezing. Chamberlain, E.J., (1980, p.325-337) MP 1934 Experimental study on factors affecting water migration in frozen clay under linear temperature gradients. Xu, X., et al., (1985, p.111-122) MP 1934 Experimental study on factors affecting water migration in frozen morin clay. Xu, X., et al., (1985, p.123-128) MP 1934 Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al., (1986, p.1014) MP 1970	Cald storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 876. Cald tolerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald weather construction Life-cycle cost effectiveness of modular megastructures is cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 899. Computer derived heat requirements for buildings in cole regions. Bennett, F.L., [1977, 113p.] Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-2: Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Hass
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype alow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1766 Nitrogen behavior in soils irrigated with liquid waste. Selim, H.M., et al., [1984, p.96-108] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, I.H., [1984, p.409-416] MP 1873 Chemical composition	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. [1978, 131p., Overconsolidated sediments in the Besufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] Overconsolidation effects of ground freezing. CR 79-28 Overconsolidation effects of ground freezing. CR 79-28 Overconsolidation effects of ground freezing. CR 79-28 Water migration in frozen clay under linear temperature gradients. Xu, X., et al., [1985, p.111-122] MP 1934 Raperimental study on factors affecting water migration in frozen morin clay. Xu, X., et al., [1985, p.121-125] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al., [1986, p.1014) MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al., [1983, p.45-50) MP 2066 Thawing of frozen clays. Anderson, D.M., et al., [1985, p.1-	SR 79-1: Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87-Cold telerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cold weather construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89: Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-4: Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-2: Mid-winter installation of protected membrane roofs in Alaska. Ledbetter, C.B., [1977, 5p.] Winter earthwork construction in Upper Michigan. Hass. W.M., et al., [1977, 5p.] SR 77-40.
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] Checkemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. CR 79-03 Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272, MP 1762 Nitrogen behavior in soils irrigated with liquid waste. Selim, H.M., et al., [1984, p.96-108] Snow chemistry of obscurants released during SNOW- TWO/Smoke Week VI. Crugin, I.H., [1984, p.409-406- MP 1873 Chemical composition of waste-water effluent in a cold climate.	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., (1978, p.638-644) MP 981 Clay selfs Ecological baseline on the Alaskan haul road. SR 78-13 (1978, 131p.) SR 78-13 (1978, 131p.) Overcomoslidated sediments in the Besufort Sea. Chamberlain, E.J., (1978, p.24-29) Blectron microscope investigations of frozen and unfrozen bentonite. Kumai, M., (1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., (1980, p.325-337) MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al., (1985, p.111-122) MP 1934 Baperimental study on factors affecting water migration in frozen morin clay. Xu, X., et al., (1985, p.123-128) MP 1937 Ion and moisture migration and frost heave in freezing Mornically. Qiu, G., et al., (1986, p.1014) MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al., (1983, p.45-50) MP 2066	Cald storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 876. Cald tolerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald weather construction Life-cycle cost effectiveness of modular megastructures is cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 899. Computer derived heat requirements for buildings in cole regions. Bennett, F.L., [1977, 113p.] Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-2: Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Hass
p.432-440) Chemical composition of haul road dust and vegetation. Is- kandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.) SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1541 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.96-108] MP 1673 Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.620-626] MP 1403	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, [1978, 131p.] Overconsolidated sediments in the Besufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.11-122] MP 1934 Experimental study on factors affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.11-122] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014) MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50, MP 2666 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.1-9] Climste Selected climatic and soil thermal characteristics of the	SR 79-1: Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87-Cold telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cold wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89: Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-4: Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] Architects and scientists in research for design of buildings in Alaska. Lefbetter, C.B., [1977, 40p.] Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Haas W.M., et al., [1977, 5p.] Temporary protection of winter construction. Bennett, F.L. [1977, 41p.] Roof construction under wintertime conditions: a case study
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutta, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] KR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272, MP 154] Nitrogen behavior in soils irrigated with liquid waste. Selim, H.M., et al., [1984, p.96-108] Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.409-416] Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.620-626] MP 1402 A.J., et al., [1980, p.347-3354] MP 1402	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., (1978, p.638-644) MP 981 Clay selfs Ecological baseline on the Alaskan haul road. SR 78-13 (1978, 131p.) SR 78-13 (1978, 131p.) Overcomoslidated sediments in the Besufort Sea. Chamberlain, E.J., (1978, p.24-29) Blectron microscope investigations of frozen and unfrozen bentonite. Kumai, M., (1979, 14p.) CR 79-28 Overcomoslidation effects of ground freezing. Chamberlain, E.J., (1980, p.325-337) MP 1980, p.325-337, MP 2066, Thawing of frozen clays. Anderson, D.M., et al., [1985, p.1-, MP 1923) Climate	Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold telerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cald weather construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776, MP 89.] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-8. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-2. Mid-winter installation of protected membrane roofs in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-2. Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 7p.] CR 77-2. Winter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] SR 77-47. Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] SR 77-37. Roof construction under wintertime conditiona: a case study Bennett, F.L., [1978, 34p.] SR 78-2.
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska, Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.409-416] MP 1673 Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.620-626] MP 1403 Porage grass growth on overland flow systems. A.J., et al., [1980, p.34-354] Phosphorus chemistry of sediments of Lake Koocanusa, Montan. Iskandar, I.K., et al., [1981, 9p.] SR 81-15	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. gr. 78, 131p.] Overconsolidated sediments in the Besufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear gradients. Xu, X., et al, [1985, p.111-122] Experimental study on factors affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.1123-128] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 2066 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.1-19] Climste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1054 Antarctic sea ice dynamics and its possible climatic effects.	Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776, MP 89.] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-40. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-21. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-2. Mid-winter installation of protected membrane roofs in Alas ka. Aamot, H.W.C., [1977, 5p.] Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 19p.] SR 78-20.
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Checkemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70-2] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] CR 79-03 Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.409-416] Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.620-626] MP 1402 Phosphorus chemistry of sodiments of Lake Koocanusa, Montans. Iskandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical coeprevention	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., (1978, p.638-644) MP 981 Clay sells Ecological baseline on the Alaskan haul road. SR 78-13 Overconsolidated sediments in the Besufort Sca. Lain, B.J., (1978, p.24-29) Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., (1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., (1980, p.325-337) Water migration in frozen clay under linear temperature gradients. Xu, X., et al., (1985, p.111-122) Experimental study on factors affecting water migration in frozen difference affecting water migration in frozen difference affecting water migration in frozen difference affecting water migration clay. Xu, X., et al., (1985, p.1123-128) MP 1897 Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al., (1986, p.1014) MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al., (1983, p.45-50) MP 2066 Thawing of frozen clays. Anderson, D.M., et al., (1985, p.1-9) Climste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al., (1975, p.3-12) MP 1953 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.P., et al., (1976, p.53-76) MP 1378	Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] Cold telerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cald weather construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776, MP 89.] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-8. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-2. Mid-winter installation of protected membrane roofs in Alaska. Ledbetter, C.B., [1977, 8p.] Winter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 19p.] Extending the useful life of DVB-2 to 1986, Part 1. Tobias
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska, Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.409-416] MP 1673 Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.620-626] MP 1403 Porage grass growth on overland flow systems. A.J., et al., [1980, p.34-354] Phosphorus chemistry of sediments of Lake Koocanusa, Montan. Iskandar, I.K., et al., [1981, 9p.] SR 81-15	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. gr. 78, [131p.] Overconsolidated sediments in the Besufort Sea. Chamberlain, B.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.111-122] Experimental study on factors affecting water migration in frozen affecting water migration in frozen affecting water migration in frozen selfecting water migration in frozen morin clay. Xu, X., et al, [1985, p.1123-128] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 2066 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.1-9] MP 1923 Climste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1923 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, [1976, p.53-76] MP 1378 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95p.]	SR 79-1: Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776, MP 89. Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-40. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-2. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-2. Mid-winter installation of protected membrane roofs in Alas ka. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 15p.] Batending the useful life of DYB-2 to 1986, Part I. Tobias son, W., et al., (1979, 15p.] SR 73-2. Snow and ice roads in the Arctic. Johnson, P.R., [1979, 1979, 1979]
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, P.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace stomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.P., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, I.H., [1984, p.94-105] MP 1873 Chemical composition Spray application of waste-water effluent in a cold climate. Caseell, E.A., et al., [1980, p.620-626] MP 1403 Proage grass growth on overland flow systems. Palazzo, A.J., et al., [1980, p.347-354] Phosphorus chemistry of sediments of Lake Koocanuaa, Montana. Iskandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical compositioe Use of de-icing salt—possible environmental impset. Minsk, L.D., [1973, p.1-2] Preeze-thaw tests of liquid deicing chemicals on selected	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., (1978, p.638-644) MP 981 Clay sells Ecological baseline on the Alaskan haul road. SR 78-13 Overcomsolidated sediments in the Besufort Sca. Chamberlain, B.J., (1978, p.24-29) Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., (1979, 14p.) CR 79-28 Overcomsolidation effects of ground freezing. Chamberlain, E.J., (1980, p.325-337) MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al., (1985, p.111-122) MP 1934 Experimental study on factors affecting water migration in frozen deform freezing MP 1897 Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al., (1986, p.1014) MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al., [1983, p.45-50) MP 2666 Thawing of frozen clays. Anderson, D.M., et al., [1985, p.1. 9 Climste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al., [1975, p.3-12] MP 1937 Environmental atlas of Alaska. Hartman, C.W., et al., (1978, 95p.) Winter surveys of the upper Susitna River, Alaska. Bilello,	Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold tolerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89: Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-6: Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] Mid-winter installation of protected membrane roofs in Alas ka. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] Temporary protection of winter construction. Bennett, F.L., [1978, 34p.] SR 77-48. Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 19p.] Stending the useful life of DYB-2 to 1986, Part 1. Tobias son, W., et al., (1979, 15p.) SR 79-2' Snow and ice roads in the Arctic. Johnson, P.R., [1979, 19.10-10.] MP 123.
p.432-440] Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70-1] Blank corrections for ultratrace atomic absorption analysis. CR 79-03 Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1762 Nitrogenous chemical composition of antarctic ice and snow. Parker and the state during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1763 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.409-416] Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.520-626] MP 1673 Porage grass growth on overland flow systems. Palazzo, A.J., et al., [1980, p.347-354] Phosphorus chemistry of sodiments of Lake Koocanusa, Montana. lakandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical lee prevention Use of de-icing salt—possible environmental impset. Minsk, L.D., [1973, p.1-2] MP 1037	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, (1978, 1315.) Overconsolidated sediments in the Besufort Sca. Chamberlain, B.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.111-122] Experimental study on factors affecting water migration in frozen affecting water migration in frozen affecting water migration clay. Xu, X., et al, [1985, p.123-128] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 2066 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.12] Chimste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1923 Chimste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1978 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95-] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.) Coastal tundra at Barrow. Brown, J., et al, 19780, p.1-29	Cald storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776, MP 89. Computer derived hear requirements for buildings in cold regions. Beanett, F.L., [1977, 113p.] SR 77-8. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-2. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] Mid-winter installation of protected membrane roofs in Alask a. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] Temporary protection of winter construction. Beanett, F.L., [1977, 41p.] Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 19p.] Extending the useful life of DYB-2 to 1986, Part 1. Tobias son, W., et al., (1979, 15p.) SR 79-8: Soow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] Snow fortifications as protection against shaped charge an itiank projectiles. Farrell, D.R., [1980, 19p.]
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, P.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace stomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.P., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1984, p.96-108] MP 1762 Nitrogen behavior in soils irrigated with liquid waste. Selin, H.M., et al., [1984, p.96-108] MP 1763 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.94-09-416] MP 1673 Chemical composition Spray application of waste-water effluent in a cold climate. Caseell, E.A., et al., [1980, p.620-626] MP 1403 Porage grass growth on overland flow systems. Palazzo, A.J., et al., [1980, p.347-354] Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical loe prevention Use of de-icing salt—possible environmental impset. Minsk, L.D., [1973, p.1-2] Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.) CR 77-28 Ice releasing block-copolymer coatings. Jellinek, H.H.O., et	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. SR 78-13 Overcomoslidated sediments in the Besufort Sca. Chamberlain, B.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] CR 79-28 Overcomoslidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.111-122] MP 1934 Experimental study on factors affecting water migration in frozen difference affecting water migration in frozen difference affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.11-122] MP 1897 Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 2666 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.1-9] Climste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1923 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.P., et al, [1976, p.53-76] MP 1378 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29]	Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold tolerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cold tolerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cald weather construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.Rt., et al., [1976, p.760-776] MP 89. Computer derived heat requirements for buildings in cold regions. Beamett, F.L., [1977, 113p.] SR 77-6; Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 4p.] CR 77-2; Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-2; Mid-winter installation of protected membrane roofs in Alas ka. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] Roof construction under wintertime conditions: a case study Beanett, F.L., [1978, 34p.] Roof construction under wintertime conditions: a case study Beanett, F.L., [1978, 34p.] SR 77-3; SR 78-2; Soow and ice roads in the Arctic. Johnson, P.R., [1979, p.106-3.1071] SR 87-9-2; Snow fortifications as protection against shaped charge an titank projectiles. Farrell, D.R., [1980, 19p.]
p.432-440] Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. CR 79-03 Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1762 Nitrogenous chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Crugin, J.H., [1984, p.409-416] Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Crugin, J.H., [1984, p.409-416] Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.520-626] MP 1673 Porage grass growth on overland flow systems. A.J., et al., [1980, p.347-354] Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical lee prevention Use of de-icing salt—possible environmental impsct. Minsk, L.D., [1973, p.1-2] Lee releasing block-copolymer coatings. Jellinek, H.H.O., et al., [1973, p.544-551] MP 1141	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, (1978, 1315.) Overconsolidated sediments in the Besufort Sca. Chamberlain, B.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.111-122] Experimental study on factors affecting water migration in frozen affecting water migration in frozen affecting water migration clay. Xu, X., et al, [1985, p.123-128] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 2066 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.12] Chimste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1923 Chimste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1978 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95-] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.) Coastal tundra at Barrow. Brown, J., et al, 19780, p.1-29	Cald storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776, MP 89. Computer derived hear requirements for buildings in cold regions. Beanett, F.L., [1977, 113p.] SR 77-8. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-2. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] Mid-winter installation of protected membrane roofs in Alask a. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] Temporary protection of winter construction. Beanett, F.L., [1977, 41p.] Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 19p.] Extending the useful life of DYB-2 to 1986, Part 1. Tobias son, W., et al., (1979, 15p.) SR 79-8: Soow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] Snow fortifications as protection against shaped charge an itiank projectiles. Farrell, D.R., [1980, 19p.]
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, P.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace stomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.P., et al., [1981, 44p.] Regett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] Nitrogen behavior in soils irrigated with liquid waste. Selim, H.M., et al., [1984, p.96-108] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.94-106] Porage grass growth on overland flow systems. Palazzo, A.J., et al., [1980, p.347-354] Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., [1981, 9p.] SR 81-15 Chessical composition Use of de-icing salt—possible environmental impset. Minsk, L.D., [1973, p.1-2] Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] Cle releasing block-copolymer coatings. Jellinek, H.H.G., et al., [1978, p.344-551] MP 1149 Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22) MP 1199	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, [1978, 131p.] Overconsolidated sediments in the Besufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.11-122] MP 1934 Experimental study on factors affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.11-123] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50, MP 2664 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.1-9] Climste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12], MP 1923 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.P., et al, [1976, p.53-76] MP 1654 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.P., et al, [1976, p.53-76] MP 1654 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.) Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29] Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29] Hydrology and climatology of a drainage basin near Pair-	Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold tolerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89. Computer derived heat requirements for buildings in cold regions. Beamett, F.L., [1977, 113p.] Computer derived heat requirements for buildings in occupation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] Winter earthwork construction in Upper Michigan. Hask. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Hask. W.M., et al., [1977, 59p.] Temporary protection of winter construction. Beanett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 19p.] Extending the useful life of DYB-2 to 1986, Part 1. Tobias son, W., et al., [1979, 15p.] SR 79-2: Snow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] Snow fortifications as protection against shaped charge an titank projectiles. Farrell, D.R., [1980, 19p.] Construction of an embankment with frozen soil. Sott, J.J. et al., [1980, 105p.] Time construction on measuring building R-values.
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70-1] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] Nitrogen behavior in soils irrigated with liquid waste. Selim, H.M., et al., [1984, p.96-108] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Crugin, J.H., [1984, p.409-40-40] Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.620-626] MP 1873 Porage grass growth on overland flow systems. A.J., et al., [1980, p.347-334] Phosphorus chemistry of sodiments of Lake Koocanusa, Montan. lakandar, I.K., et al., [1981, 9p.] Chemical ice prevention Use of de-icing salt—possible environmental impset. Minsk, L.D., [1973, p.1-2] Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al., [1978, p.344-551] MP 1141 Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] MP 1199 Ice fog suppression using reinforced thin chemical films.	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, (1978, 131p.) Overconsolidated sediments in the Besufort Sca. Chamberlain, B.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1954 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.111-122] Experimental study on factors affecting water migration in frozen affecting water migration in frozen affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.1123-128] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 1970 Clays Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1923 Chimste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1923 MP 1378 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29] MP 1356 Environment of the Alaskan Haul Road. Brown, J., [1980, p.3-52]	Cald storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cald telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776, MP 89. Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-40. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-21. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-22. Mid-winter installation of protected membrane roofs in Alas ka. Aamot, H.W.C., [1977, 5p.] CR 77-22. Winter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] SR 77-40. Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] SR 77-22. Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., (1979, 19p.) SR 78-22. Snow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] Snow fortifications as protection against shaped charge an ittank projectiles. Farrell, D.R., [1980, 19p.] Construction of an embankment with frozen soil. et al., [1980, 105p.] Time construction of an embankment with frozen soil. SR 80-2. Time construction of an embankment with frozen soil. Edst, 1,1980, 30p.) CR 80-12.
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska, Page, F.W., et al., [1978, 70-2] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.409-416] MP 1673 Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.620-626] MP 1673 Porage grass growth on overland flow systems. A.J., et al., [1980, p.34-354] Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., [1981, 9p.] Chemical los prevention Use of de-icing salt—possible environmental impset. Minsk, L.D., (1973, p.1-2) Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al., [1978, p.544-551) CR 77-28 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al., [1978, p.544-551) MP 1199 Ice fog suppression using reinforced thin chemical filma. MCFadden, T., et al., [1978, p.21-22] MP 1199 Ice fog suppression using reinforced thin chemical filma. MCFadden, T., et al., [1978, p.21-22] MP 1999.	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, [1978, 131p.] Overconsolidated sediments in the Besufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.11-122] MP 1934 Experimental study on factors affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.11-122] MP 1979 Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 2066 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.1-9] Climste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1934 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, [1976, p.53-76] MP 1378 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95p.] Winter surveys of the upper Susitna River, Alaska. Biello, M.A., [1980, 30p.) SR 80-19 Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29] MP 1356 Environment of the Alaskan Haul Road. Brown, J., [1980, p.3-52] Hydrology and climatology of a drainage basin near Pairbanks, Alaska. Haugen, R.K., et al, [1982, 34p., C.R 82-26 Climate of remote areas in north-central Alaska: 1975-1979	Cold storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald weather construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89. Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.) SR 77-8. Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.) SR 77-8. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., (1977, 8p.) CR 77-1. Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Haas w.M., et al., [1977, 5p.] Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 19p.] SR 79-8. SR 79-9. Snow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] Snow fortifications as protection against shaped charge an itiank projectiles. Farrell, D.R., [1980, 19p.] Construction of an embankment with frozen soil. et al., [1980, 105p.] Time constraints on measuring building R-values. S.N., [1980, 30p.] Use of pliing in frozen ground. Croyy, F.E., [1980, 21 p.] MP 148.
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70-2] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutta, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1876 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Crugin, J.H., [1984, p.90-108] MP 1873 Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.620-626] MP 1873 Porage grass growth on overland flow systems. Palazzo, A.J., et al., [1980, p.347-334] Phosphorus chemistry of sodiments of Lake Koocanusa, Montan. lakandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical ice prevention Use of de-icing salt—possible environmental impset. Minsk, L.D., [1977, 15p.] Cre 77-22 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al., [1978, p.344-551] MP 1141 Current research on snow and ice removal in the United States. Minsk, L.D., [1977, 15p.] CR 77-28 Noncorrosive methods of ice control. Minsk, L.D., [1979, p.133-162] Noncorrosive methods of ice control. Minsk, L.D., [1979, p.133-162]	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, (1978, 131p.) Overconsolidated sediments in the Besufort Sca. Chamberlain, B.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.111-122] Experimental study on factors affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.1123-128] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 2066 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.1-9] MP 1923 Climate Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1938 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] Castal tundra at Barrow. Brown, J., et al, [1980, p.1-29] MP 1356 Environment of the Alaskan Haul Road. Brown, J., [1980, p.1-29] MP 1356 Environment of the Alaskan Haul Road. Brown, J., [1980, p.1-29] MP 1350 CR 82-26 Climate of remote areas in north-central Alaska: 1975-1978 summary. Haugen, R.K., [1982, 110p.] CR 82-28	Cald storage Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cald telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776, MP 89. Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-40. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-21. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-22. Mid-winter installation of protected membrane roofs in Alas ka. Aamot, H.W.C., [1977, 5p.] CR 77-22. Winter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] SR 77-40. Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] SR 77-22. Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., (1979, 19p.) SR 78-22. Snow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] Snow fortifications as protection against shaped charge an ittank projectiles. Farrell, D.R., [1980, 19p.] Construction of an embankment with frozen soil. et al., [1980, 105p.] Time construction of an embankment with frozen soil. SR 80-2. S.N., [1980, 30p.] CR 80-12.
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, 70-1] MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70-2] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] MP 1395 Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] NP 1841 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.40-916] Chemical composition Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, p.620-626] MP 1673 Porage grass growth on overland flow systems. Palazzo, A.J., et al., [1980, p.347-354] Phosphorus chemistry of sodiments of Lake Koocanusa, Montana. Iskandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical loe prevention Use of de-icing salt—possible environmental impsct. Minsk, L.D., [1973, p.1-2] Le releasing block-copolymer coatings. Jellinek, H.H.O., et al., [1978, p.21-22] MP 1937 Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] CR 77-28 Le releasing block-copolymer coatings. Jellinek, H.H.O., et al., [1978, p.21-22] MP 1937 Programment research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] MP 1931 Le fog suppression in Arctic communities. McFadden, T., (1980, p.34-651) MP 1337	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, [1978, 131p.] Overconsolidated sediments in the Besufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.111-122] Raperimental study on factors affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.11-122] MP 1970 Clays Ison and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 2066 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.1-9] Chimste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12], MP 1934 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, [1976, p.53-76] MP 1378 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] SR 80-19 Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29, MP 1356 Environment of the Alaskan Haul Road. Brown, J., [1980, p.3-52] Hydrology and climatology of a drainage basin near Fairbanks, Alaska. Haugen, R.K., et al, [1982, 34p., CR 82-26 Climate of remote areas in north-central Alaska: 1975-1979 summary. Haugen, R.K., et al, [1982, 110p., CR 82-35 Climate at CRREL, Hanover, New Hampahire. Bates, R.E., [1984, 78p.]	Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89. Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-40. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-11. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 40p.] CR 77-21. Mid-wrinter installation of protected membrane roofs in Alas ka. Aamot, H.W.C., [1977, 5p.] CR 77-21. Winter earthwork construction in Upper Michigan. Haas W.M., et al., [1977, 5p.] Temporary protection of winter construction. Bennett, F.L. (1977, 41p.) SR 77-40. Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., (1979, 19p.) SR 79-2. Snow and ice roads in the Arctic. Johnson, P.R., (1979, p.1063-1071) Snow fortifications as protection against shaped charge an itank projectiles. Farrell, D.R., (1980, 19p.) Construction of an embankment with frozen soil. Botz, J.J. et al., (1980, 30p.) Use of piling in frozen ground. Crory, F.E., (1980, 21p.) MP 148 Snow pads for pipeline construction in Alaska. Johnson
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] MP 1116 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, P.W., et al., [1978, 70p.) SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] CR 79-03 Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.40-94-16] TWO/Smoke Week VI. Cragin, J.H., [1984, p.40-94-16] Forage grass growth on overland flow systems. Palazzo, A.J., et al., [1980, p.347-3354] MP 1402 Phosphorus chemistry of sodiments of Lake Koocanusa, Montans. Iskandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical composition Use of de-icing salt—possible environmental impact. Minsk, L.D., [1973, p.1-2] Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al., [1973, p.34-551] CMP 133-162] Ice fog suppression using reinforced thin chemical films. McFadden, T., et al., [1978, 23p.] CR 77-28 Ice fog suppression in Arctic communities. McFadden, T., (1980, p.46-5) Optimizing decicing chemical application rates. Minsk, L.D., [1979, 1979, 1979, 1979, 1979, 1979, 1970, 19	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, (1978, 1315.) Overconsolidated sediments in the Besufort Sca. Chamberlain, B.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.111-122] Experimental study on factors affecting water migration in frozen affecting water migration in frozen affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.123-128] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014) Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50) MP 2066 Thawing of frozen clays. Anderson, D.M., et al, [1985, p.1-9] Chimste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1923 Chimste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1936 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, [1976, p.53-76] Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.) Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29] MP 1376 Environment of the Alaskan Haul Road. Brown, J., [1980, p.3-52] Hydrology and climatology of a drainage basin near Fairbanks, Alaska. Haugen, R.K., [1982, 110p.) CR 82-35 Climate of remote areas in north-central Alaska. 1975-1979 summary. Haugen, R.K., [1982, 110p.) CR 82-35 Climate of remote areas in north-central Alaska. 1975-1979 summary. Haugen, R.K., [1982, 110p.] CR 82-35 Climate of remote areas in north-central Alaska.	Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold tolerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cold tolerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cold wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89: Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-4: Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 40p.] CR 77-2: Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-2: Mid-winter installation of protected membrane roofs in Alas ka. Aamot, H.W.C., [1977, 5p.] CR 77-2: Minter earthwork construction in Upper Michigan. Hass W.M., et al., [1977, 59p.] SR 77-4: Temporary protection of winter construction. Bennett, F.L., [1977, 4p.] Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1978, 34p.] SR 78-2: SR 79-2: SR 79-2: SR 79-2: Snow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] Snow fortifications as protection against shaped charge an titank projectiles. Farrell, D.R., [1980, 19p.] Construction of an embankment with frozen soil. et al., [1980, 105p.] SR 88-1: Construction of an embankment with frozen soil. et al., [1980, 105p.] SR 88-1: Construction of an embankment with frozen soil. et al., [1980, 105p.] SR 89-1:
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al., [1978, 70-2] SR 78-14 Blank corrections for ultratrace atomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanka, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.F., et al., [1981, 44p.] Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] SR 81-26 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Nitrogenous chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Crugin, J.H., [1984, p.409-446] Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Crugin, J.H., [1984, p.409-446] Cassell, E.A., et al., [1980, p.620-626] MP 1873 Porage grass growth on overland flow systems. Palazzo, A.J., et al., [1980, p.347-354] Phosphorus chemistry of sediments of Lake Koocanusa, Montana. lakandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical ice prevestion Use of de-icing salt—possible environmental impset. Minsk, L.D., [1973, p.1-2] Ice releasing block-copolymer coatings. Jellinek, H.H.O., et al., [1978, p.544-551] MP 1037 Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] R 79-28 Ice releasing block-copolymer coatings. Jellinek, H.H.O., et al., [1978, p.544-551] MP 1037 Preeze-thaw tests of liquid deicing chemicals on selected pavement materials in some part of the chemical films. McFadden, T., et al., [1978, 23p.] Nocotrosive methods of ice control. Minsk, L.D., [1979, p.133-162] Le	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al., [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed., (1978, 131p.) Overconsolidated sediments in the Besufort Sea. Chamberlain, E.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., (1979, 14p.) CR 79-28 Overconsolidation effects of ground freezing. Chamberlain, E.J., (1980, p.325-337) MP 1452 Water migration in frozen clay under linear temperature gradients. Xu, X., et al., [1985, p.111-122] Baperimental study on factors affecting water migration in frozen morin clay. Xu, X., et al., [1985, p.112-122] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al., [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al., [1983, p.45-50) MP 2066 Thawing of frozen clays. Anderson, D.M., et al., [1985, p.1-9] Chimste Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al., [1975, p.3-12, MP 1934 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al., [1976, p.53-76] MP 1378 Environmental atlas of Alaska. Hartman, C.W., et al., [1978, 95p.] Winter surveys of the upper Susitna River, Alaska. Biello, M.A., [1980, 30p.) SR 80-19 Coastal tundra at Barrow. Brown, J., et al., [1980, p.1-29, MP 1356 Environment of the Alaskan Haul Road. Brown, J., [1980, p.3-52] Hydrology and climatology of a drainage basin near Fairbanka, Alaska. Haugen, R.K., et al., [1982, 34p., CR 82-35 Climate of remote areas in north-central Alaska: 1975-1979 summary. Haugen, R.K., et al., [1982, 34p., CR 82-35 Climate at CRREL, Hanover, New Hampshire. SR 84-24 Climate changes Greenland climate changes shown by ice core. Danagaard, W., et al., (1971, p.17-22)	Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold telerance Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.J., et al., [1984, 89-] Cold wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89. Computer derived heat requirements for buildings in cold regions. Bennett, P.L., [1977, 113p-] SR 77-40. Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-21. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 40p.] CR 77-21. Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] CR 77-22. Winter earthwork construction in Upper Michigan. Haas W.M., et al., [1977, 5p.] Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] SR 77-47. Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] SR 77-49. Roof construction under wintertime conditions: a case study Bennett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 19p.] SR 78-42. Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 19p.] SR 79-42. Snow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] Snow fortifications as protection against shaped charge an titank projectiles. Farrell, D.R., [1980, 19p.] Construction of an embankment with frozen soil. Betz, J. et al., [1980, 105p.] Time constraints on measuring building R-values. S.N., [1980, 21p.] MP 140 Snow pads for pipeline construction in Alaska. Johnson P.R., et al., [1980, 28p.] Construction of foundations in permafrost. Linell, K.A., et al., [1980, 310p.] SR 89-2. Construction of foundations in permafrost. Linell, K.A., et al., [1980, 310p.] SR 89-3.
p.432-440) Chemical composition of haul road dust and vegetation. Iskandar, I.K., et al., [1978, p.110-111] Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, P.W., et al., [1978, 70p.] SR 78-14 Blank corrections for ultratrace stomic absorption analysis. Cragin, J.H., et al., [1979, 5p.] Winter air pollution at Pairbanks, Alaska. Coutts, H.J., et al., [1981, p.512-528] Wastewater treatment by a prototype slow rate land treatment system. Jenkins, T.P., et al., [1981, 44p.] CR 81-14 Halocarbons in water using headspace gas chromatography. Leggett, D.C., [1981, 13p.] Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al., [1981, p.79-81] Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1541 Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1762 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Crugin, I.H., [1984, p.94-105] MP 1762 Chemical composition Spray application of waste-water effluent in a cold climate. Caseell, E.A., et al., [1980, p.620-626] MP 1403 Porage grass growth on overland flow systems. Palazzo, A.J., et al., [1980, p.347-354] Phosphorus chemistry of sediments of Lake Koocanuaa, Montana. Iskandar, I.K., et al., [1981, 9p.] SR 81-15 Chemical compositioe Minsk, L.D., [1973, p.1-2] Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al., [1978, p.344-551] Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] MP 1199 Ice fog suppression using reinforced thin chemical films. McFadden, T., et al., [1978, 23p.] NP 1292. Noncorrosive methods of ice control. Minsk, L.D., [1978, p.344-551] Optimizing deicing chemical application rates. McFadden, T., (1980, p.546-51) Optimizing deicing chemical application rates. Minsk, L.D., [1978, p.21-22] MP 1932.	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, [1978, p.638-644] MP 981 Clay sells Ecological baseline on the Alaskan haul road. Brown, J., ed, [1978, 131p.] Overconsolidated sediments in the Besufort Sea. Chamberlain, B.J., [1978, p.24-29] Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., [1979, 14p.] Overconsolidation effects of ground freezing. Chamberlain, E.J., [1980, p.325-337] MP 1253 Water migration in frozen clay under linear temperature gradients. Xu, X., et al, [1985, p.11-122] Ryenimental study on factors affecting water migration in frozen morin clay. Xu, X., et al, [1985, p.11-121] Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MP 1970 Clays Isothermal compressibility of water mixed with montmorillonite. Oliphant, J.L., et al, [1983, p.45-50] MP 1970 Climate Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1923 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, [1976, p.53-76] Winter surveys of the upper Susitna River, Alaska. MP 1378 Environmental atlas of Alaska. Hartman, C.W., et al, [1978, 95p.] Winter surveys of the upper Susitna River, Alaska. Biello, M.A., [1980, 30p.] Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29] Winter surveys of the upper Susitna River, Alaska. Biello, M.A., [1980, 30p.] Coastal tundra at Barrow. Brown, J., et al, [1982, 34p.] Coastal tundra at Barrow. Brown, J., et al, [1982, 34p.] Coastal tundra at Barrow. Brown, J., et al, [1982, 34p.] Coastal tundra at Barrow. Brown, J., et al, [1982, 34p.] Coastal tundra at Barrow. Brown, J., et al, [1982, 34p.] Coastal tundra at Barrow. Brown, J., et al, [1982, 34p.] Coastal tundra at CRREL, Hanover, New Hampahire. Bates, R.E., [1984, 78p.] Climate of remote areas in north-central Alaska: 1975-1979 summary. Haugen, R.K., [1982, 110p.] CR 82-26 Climate of remote areas in north-central Alaska: 1975-1979 summary. H	Polar ice-core storage facility. Langway, C.C., Jr., [1976, p.71-75] MP 87. Cold tolerance Aquatic plant growth in relation to temperature and unfrozer water content. Palazzo, A.J., et al., [1984, 8p.] Cald wasther construction Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., [1976, p.760-776] MP 89. Computer derived heat requirements for buildings in cold regions. Beamett, F.L., [1977, 113p.] SR 77-8. Computer derived heat requirements for buildings in cold regions. Beamett, F.L., [1977, 113p.] SR 77-8. Computer derived heat requirements for buildings in cold regions. Beamett, F.L., [1977, 13p.] CR 77-1. Architects and scientists in research for design of buildings in Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-2. Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] Winter earthwork construction in Upper Michigan. Haas W.M., et al., [1977, 59p.] Temporary protection of winter construction. Beanett, F.L., [1978, 34p.] Communication in the work place: an ecological perspective Ledbetter, C.B., [1979, 15p.] SR 77-8. SR 79-2. Saow and ice roads in the Arctic. Johnson, P.R., [1979, 106-1071] Snow fortifications as protection against shaped charge an titank projectiles. Farrell, D.R., [1980, 19p.] Construction of an embankment with frozen soil. SR 80-2. Time constraints on measuring building R-values. S.N., [1980, 30p.] Use of piling in frozen ground. Crory, F.E., [1980, 21p.] MP 148. Snow pads for pipeline construction in Alaska. P.R., et al., [1980, 28p.] Construction of foundations in permafrost. Linell, K.A., et al., [1980, 28p.] Construction of foundations in permafrost. Linell, K.A., et al., [1980, 128p.]

sur, A., [1980, p.47-53] MP 1345	O.L., [1985, p.9-20] MP 2844	investigation. Johnson, R., (1979, 33p.) CR 79-65
Excevation of frozen materials. Moore, H.B., et al., 1980, p.323-345; MP 1360	Need for snow tire characterization and evaluation. Yong, R.N., et al, [1985, p.1-2] MP 2643	Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] MP 1078
Regulated set concrete for cold weather construction.	Cold weather tests	Temperature effect on the uniaxial strength of ice. Haynes,
Sayles, F.H., et al., [1980, p.291-314] MP 1359	Waste water reuse in cold regions. Iskandar, I.K., [1978, p.361-368] MP 1144	F.D., [1979, p.667-681] MP 1231
U.SSoviet seminar on building under cold climates and on permafrost. [1980, 365p.] SR 88-40	Nondestructive testing of in-service highway pavements in	Computer applications Flexible pavement resilient surface deformations. Smith, N.,
Window performance in extreme cold. Flanders, S.N., et al., r1981, p. 396-4061 MP 1393	Maine. Smith, N., et al., [1979, 22p.] CR 79-86	et al. (1975, 13 leaves) MP 1264
[1981, p.396-408] MP 1393 Drainage facilities of airfields and heliports in cold regions.	Construction and performance of membrane encapsulated soil layers in Alaska. Smith, N., 1979, 27p.;	Landsat data for watershed management. Cooper, S., et al. [1977, c150p.] MP 1114
Lobacz, E.P., et al, [1981, 56p.] SR 81-22	CR 79-16 Land treatment of waste water in cold climates. Jenkins.	Safe ice loads computed with a pocket calculator. Nevel,
Comparative analysis of the USSR construction codes and the US Army technical manual for design of foundations on	Land treatment of waste water in cold climates. Jenkins, T.F., et al, (1979, p.207-214) MP 1279	D.E., (1979, p.203-223) MP 1249 Conference on Computer and Physical Modeling in Hydrau-
permafrost. Fish, A.M., [1982, 20p.] CR 82-14	Air-transportable Arctic wooden shelters. Planders, S.N., et al, 1982, p.385-3971 MP 1558	lic Engineering, 1980. Ashton, G.D., ed, {1980, 492p.} MP 1321
Piling in frozen ground. Crory, F.E., [1982, p.112-124] MP 1722	al, [1982, p.385-397] MP 1558 Blisters in built-up roofs due to cold weather. Korhonen, C.,	Topical databases: Cold Regions Technology on-line. Lis-
Window performance in extreme cold. Planders, S.N., et al,	et al, [1983, 12p.] SR 83-21	ton, N., et al, [1985, p.12-15] MIP 2027
[1982, 21p.] CR 82-38 Chens Flood Control Project and the Tanana River near Fair-	Compacting Temperature effects in compacting an asphalt concrete over-	Cazenovia Creek Model data acquisition system. Bennett, B.M., et al, [1985, p.1424-1429] MP 2899
benks, Alaska. Ruska, J.S., et al., (1984, 11p. + figs.)	lay. Eaton, R.A., et al, [1978, p.146-158] MP 1083	Data acquisition in USACRREL's flume facility. Daly, S.F.,
MP 1745 loe forces on rigid, vertical, cylindrical structures. Sodhi,	Compressed six Use of compressed air for supercooled fog dispersal. Wein-	et al, [1985, p.1053-1058] MP 2009 Instrumentation for an uplifting ice force model. Zabilansky,
D.S., et al, [1984, 36p.] CR 84-33	stein, A.L., et al, [1976, p.1226-1231] MP 1614	L.J., [1985, p.1430-1435] MP 2091
Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed, [1986,	Compressive properties Laboratory investigation of the mechanics and hydraulics of	Computer programs Long distance heat transmission with steam and hot water.
var.p.) MP 2135	river ice jams. Tatinclaux, J.C., et al, [1977, 45p.]	Aamot, H.W.C., et al., [1976, 39p.] MP 938
Cold weather operation	CR 77-09 Strength of frozen silt as a function of ice content and dry unit	Computer program for determining electrical resistance in
Regionalized fessibility study of cold weather earthwork. Roberts, W.S., [1976, 190p.] SR 76-02	weight. Sayles, F.H., et al, [1980, p.109-119]	nonhomogeneous ground. Arcone, S.A., [1977, 16p.] CR 77-62
Storm drainage design considerations in cold regions.	MP 1451 Regulated set concrete for cold weather construction.	Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-43
Lobacz, E.F., et al, [1978, p.474-489] MP 1868 Effects of winter military operations on cold regions terrain.	Sayles, F.H., et al., [1980, p.291-314] MIP 1359	Computer routing of unsaturated flow through snow. Tuck-
Abele, G., et al, [1978, 34p.] SR 78-17	Investigation of the snow adjacent to Dye-2, Greenland. Ueda, H.T., et al, [1981, 23p.] SR 81-03	er, W.B., et al, [1977, 44p.] SR 77-10
Saow fortifications as protection against shaped charge antitank projectiles. Farrell, D.R., (1980, 19p.)	Measuring mechanical properties of ice. Schwarz, J., et al,	Finite element model of transient heat conduction. Guy- mon, G.L., et al, [1977, 167p.] SR 77-38
	[1981, p.245-254] MIP 1556	Land treatment module of the CAPDET program. Merry,
Engine starters in winter. Coutts, H.J., [1981, 37p.] SR 81-32	Acoustic emissions from polycrystalline ice. St. Lawrence, W.F., et al., (1982, 15p.) CR 82-21	C.J., et al. (1977, 4p.) MP 1112 Computer procedure for comparing wastewater treatment
CRREL instrumented vehicle for cold regions mobility meas-	Creep behavior of frozen silt under constant uniaxial stress. Zhu, Y., et al. r1983, p.1507-1512; MP 1895	systems. Spaine, P.A., et al, [1978, p.335-340]
urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Low temperature automotive emissions. Coutts, H.J.,	Zhu, Y., et al, [1983, p.1507-1512] MP 1895 Isothermal compressibility of water mixed with montmorillo-	MP 1155 Computer file for existing land application of wastewater sys-
[1983, 2 vols.] MP 1703	nite. Oliphant, J.L., et al, [1983, p.45-50] MIP 2066	tems. Iskandar, I.K., et al, [1978, 24p.] SR 78-22
Observations during BRIMFROST '83. Bouzoun, J.R., et al, [1984, 36p.] SR 84-10	Variation of ice strength within and between multiyear pressure ridges in the Besufort Sea. Weeks, W.F., [1984,	Design of liquid-waste land application. Iskandar, I.K., [1979, p.65-88] MP 1415
Maintaining frosty facilities. Reed, S.C., et al, [1985, p.9-	p.134-139 ₁ MP 1680	Multivariable regression algorithm. Blaisdell, G.L., et al,
15 ₁ MP 1949 Some recent developments in vibrating wire rock mechanics	Summary of the strength and modulus of ice samples from multi-year pressure ridges. Cox, G.F.N., et al, [1984,	[1983, 41p.] SR 83-32 Numerical simulation of sea ice induced gauges on the shelves
instrumentation. Dutta, P.K., [1985, 12p.] MP 1968	p.126-133 ₁ MP 1679	of the polar oceans. Weeks, W.P., et al, [1985, p.259-
Tank B/O sensor system performance in winter: an overview.	Preliminary examination of the effect of structure on the com- pressive strength of ice samples from multi-year pressure	265 ₁ MP 1938
Tanamba T at al -1095 26a - MID 2072	breaste seculos o se sembre non mana-les breaste	Computed almolation
Lacombe, J., et al., [1985, 26p.] MP 2073 Cold weather O&M. Reed, S.C., et al., [1985, p.10-15]	ridges. Richter, J.A., et al. [1984, p.140-144]	Computerized simulation Computer simulation of the snowmelt and soil thermal regime
Cold weather O&M. Reed, S.C., et al, [1985, p.10-15] MP 2079	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. Cole, D.M.,	Computer simulation of the snowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al, [1975, p.709-715]
Cold weather O&M. Reed, S.C., et al. (1985, p.10-15) MP 2079 Cold factor. Abele, G., (1985, p.480-481) MP 2024	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. Cole, D.M., [1984, p.150-157] MP 1686	Computer simulation of the snowmelt and soil thermal regime
Cold weather O&M. Read, S.C., et al. (1985, p.10-15; MP 2070 Cold factor. Abele, G., (1985, p.480-481; MP 2024 Cold climate utilities manual. Smith, D.W., ed. (1986, MP 2135	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] MP 1686 Mechanical properties of multi-year sea ice. Testing tech-	Computer simulation of the snowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., 11975, p.709-715, MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., 11977, p.24-32;
Cold weather O&M. Reed, S.C., et al., [1985, p.10-15], MP 2079 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] Cold weather performance	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. Cole, D.M., [1984, p.150-157] Mechanical properties of multi-year sea ice. Testing techniques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984,	Computer simulation of the snowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al. 11975, p.709-715, MP \$57 Computer modeling of terrain modifications in the arctic and
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. MP 933	ridges. Richter, J.A., et al. [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al. [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al. [1984, p.3-15] MP 1773	Computer simulation of the snowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715]. MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32]. MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] CR 77-36
Cold weather O&M. Read, S.C., et al., [1985, p.10-15], MP 2070 Cold factor. Abele, G., [1985, p.480-481] Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933 Plaid performance of a subarctic utilidor. Read, S.C.,	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. Cole, D.M., [1984, p.150-157] Mechanical properties of multi-year sea ice. riques. Mellor, M., et al., [1984, 39p.] Compressive strength of trozen sit. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. Morris, C.E., MP 1834	Computer simulation of the snowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715]. MP \$57 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32]. MP 971 Computer model of municipal snow removal. Tucker, W.B.,
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. MP 933	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen sit. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. Cole, D.M.,	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., 1975, p.709-715, MP \$57 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., 1977, p.24-32, MP 971 Computer model of municipal snow removal. Tucker, W.B., (1977, 7p.) CR 77-36 Finite element model of transient heat conduction. Guymon, G.L., et al., 1977, 167p.; Bubbler induced melting of ice covers. Keribar, R., et al.,
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140, MP 933 Field performance of a subarctic utilidor. [MP 930] Effects of subgrade preparation upon full depth performance in cold regions. Eaton, R.A., [1978, p.459-	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. Cole, D.M., Influence of grain size on the ductility of ice. Cole, D.M., Influence of grain size and the compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. Moltri, C.E., et al., [1984, p.1-9] Grain size and the compressive strength of ice. Cole, D.M., [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cox,	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715]. MIP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32]. MIP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366).
Cold weather O&M. Read, S.C., et al., [1985, p.10-15], MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933 Field performance of a subarctic utilidor. Read, S.C., MP 930 Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] MP 1087 Construction equipment problems and procedures: Alaska	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. Coz., MP 1836 Coz., MP 1836	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., 1975, p.709-715, MP \$57 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., 1977, p.24-32, MP 971 Computer model of municipal snow removal. Tucker, W.B., (1977, 7p.) Finite element model of transient heat conduction. Guymon, G.L., et al., 1977, 167p.; SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., (1978, p.362-366) Computer simulation of urban snow removal. Tucker, W.B., et al., (1979, p.293-302) MP 1238
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] Cold climate utilities manual. Smith, D.W., ed., [1986, MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] Fleid performance of a subarctic utilidor. Read, S.C., [1977, p.448-468] Effects of subgrade preparation upon full depth pewement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 149-)	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen sit. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cox, G.F.N., et al., [1985, p.93-98] Structure and the compressive strength of ice from pressure ridges. Cox, RIP 1848 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102]	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715]. MP \$57 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32]. MP 971 Computer model of municipal snow removal. Tucker, W.B., (1977, 7p.) Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., (1978, p.362-366). MP 1160 Computer simulation of urban snow removal. Tucker, W.B.,
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140, MF 933 Flield performance of a subarctic utilidor. Read, S.C., (1977, p.448-468, MP 330 Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473, 473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-11 Performance of overland flow land treatment in cold climates.	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. G.F.N., et al., [1985, p.39-8] MP 1848 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., 1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., 1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., (1977, 7p.) Finite element model of transient heat conduction. Guymon, G.L., et al., 1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., (1978, p.362-366) Computer simulation of urban snow removal. Tucker, W.B., et al., (1979, p.293-302) Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1296 Cascrete semixtures
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] Cold climate utilities manual. Smith, D.W., ed., [1986, Var.p.] Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] Fleid performance of a subarctic utilidor. Read, S.C., [1977, p.448-468] Effects of subgrade preparation upon full depth pewement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Ferformance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1182	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cox. [1985, p.39-98] Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1848 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715]. MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366) Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1296 Concreta admixtures Cements for structural concrete in cold regions. Johnson, R.,
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] Cold weather performance Effect of snow cover on obstacle performance of whicles. Hanamoto, B., [1976, p.12-140, MP 933] Field performance of a subarctic utilidor. Read, S.C., [1977, p.448-468, MP 930] Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] Wastewater treatment in cold regions by overland flow Marci, C.J., et al., [1980, 14p.] CR 80-07	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.) Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. G.F.N., et al., [1985, p.93-98] MP 1848 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter, MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al.,	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., 1975, p.709-715, MP \$57 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., 1977, p.24-32, MP 971 Computer model of municipal snow removal. Tucker, W.B., (1977, 7p.) Finite element model of transient heat conduction. Guymon, G.L., et al., 1977, 167p.; SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., (1978, p.362-366) Computer simulation of urban snow removal. Tucker, W.B., et al., (1979, p.293-302) Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, (1980, p.299-356) Concrete semixtures Cements for structural concrete in cold regions. Johnson, R., (1977, 13p.) Concrete caring
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] Fleid performance of a subarctic utilidor. Read, S.C., [1977, p.448-468] Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alsaka pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates, Jenkins, T.F., et al., [1978, p.61-70] MP 1183 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] Operation of the CRREL prototype sit transportable shelter.	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cole, D.M., MP 1836 Structure and the compressive strength of ice from pressure ridges. Col.F.N., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.476-488] Pressure ridge strength in the Beaufort Sea. Weeks, W.F.,	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715]. MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., (1977, 7p.) Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., (1978, p.362-366) Computer simulation of urban snow removal. Tucker, W.B., et al., (1979, p.293-302) Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] NP 1296 Concreta admixtures Cements for structural concrete in cold regions. Johnson, R., (1977, 13p.) SR 77-35 Concrete caring Detection of moisture in construction materials. Morey,
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.12-140,] Field performance of a subarctic utilidor. Read, S.C., [1977, p.448-468, MP 930 Effects of subgrade preparation upon full depth perment performance in cold regions. Eaton, R.A., [1978, p.459-473, MP 1087 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 149.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1152 Wastewater treatment in cold regions by overland flow. Marcid, C.J., et al., [1980, [4p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1980, 75p.] Spray application of waste-water effluent in a cold climate.	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.) Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. Cole, D.M., [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cox, G.F.N., et al., [1985, p.39-8] MP 1848 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter, MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.476-488] Pressure ridge strength in the Beaufort Sea. MP 1879 MP 1878 Pressure ridge strength in the Beaufort Sea. MP 1212	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Camerate admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Camerate carlag Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Cements for structural concrete in cold regions. Johnson, R., CR 77-25 Cements for structural concrete in cold regions. Johnson, R.,
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] Field performance of a subarctic utilidor. Read, S.C., [1977, p.448-468] Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alsaka pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates, Jenkins, T.F., et al., [1978, p.61-70] MP 1132 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] Operation of the CRRBL prototype sir transportable shelter. Flanders, S.N., [1980, 73p.) Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 520-6265) MP 1403	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cole, D.M., MP 1836 Structure and the compressive strength of ice from pressure ridges. Cole, D.M., MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.465-475] Pressure ridge strength in the Beaufort Sea. (MP 1879 MP 1879	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715]. MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., (1977, 7p.) Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., (1978, p.362-366) Computer simulation of urban snow removal. Tucker, W.B., et al., (1979, p.293-302) Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] NP 1296 Concrete admixtures Cements for structural concrete in cold regions. Johnson, R., (1977, 13p.) Communical modeling of sea ice in construction materials. Morey, R.M., et al., (1977, 9p.) Communical modeling of sea ice in cold regions. Johnson, R., R.M., et al., (1977, 9p.) Communical modeling of sea ice in cold regions. Johnson, R., R.M., et al., (1977, 9p.) Communical modeling of sea ice in cold regions. Johnson, R., SR 77-35
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.12-140,] Field performance of a subarctic utilidor. Read, S.C., [1977, p.448-468, MP 930 Effects of subgrade preparation upon full depth perment performance in cold regions. Eaton, R.A., [1978, p.459-473, MP 1087 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 149.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1152 Wastewater treatment in cold regions by overland flow. Marcid, C.J., et al., [1980, [4p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1980, 75p.] Spray application of waste-water effluent in a cold climate.	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.) Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.20-226] Strength and modulus of ice from pressure ridges. Coz., [1985, p.20-226] Strength and modulus of ice from pressure ridges. Coz., [1985, p.420-26] MP 1848 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.476-488] Pressure ridge strength in the Beaufort Sea. Weeks, W.F., [1985, p.476-488] Richter-Menge, J.A., [1985, p.244-251] Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] MP 1936 Grain size and the compressive strength of ice. Coke, D.M., MP 1878	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Comercte admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete curing Detection of moisture in construction materials. Morey, R.M., et al., [1977, p.3] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Computer simulation of urban snow removal. Johnson, R., [1977, 13p.] SR 77-35 Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.]
Cold weather O&M. Reed, S.C., et al., [1985, p.10-15], MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933 Field performance of a subarctic utilidor. Reed, S.C., (1977, p.448-468) Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-11 Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1132 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] Coperation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1990, 73p.] Spray application of waste-water effluent in a cold climate. Samples, E.A., et al., [1980, 620-626] MP 1403 Structural evaluation of porous pavement in cold climate. Baton, R.A., et al., [1980, 43p.]	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cole, D.M., MP 1838 Structure and the compressive strength of ice from pressure ridges. Cox., cl., et al., [1985, p.39-395] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.465-475] MP 1879 Pressure ridge strength in the Beaufort Sea. Richter-Menge, J.A., [1985, p.244-251] Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] MP 1936 Grain size and the compressive strength of ice. Cole, D.M., MP 1907 Confined compressive strength of multi-year pressure ridge samples.	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] MP 1160 Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Concrete shalktures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete curing Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Computer distribution of the seasonal sea ice cold regions. Johnson, R., [1977, 13p.] Concrete curing Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Computer distribution of moisture in cold regions. Johnson, R., [1977, 13p.] Concrete distribution of moisture in cold regions. Johnson, R., [1977, 13p.] Concrete distribution of moisture in cold regions. Johnson, R., [1977, 13p.] Concrete characterials. Minsk, L.D., [1977, 16p.]
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. MP 933 Field performance of a subarctic utilidor. Read, S.C., [1977, p.448-468, MP 930 Effects of subgrade preparation upon full depth performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 149-3] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] Wastewater treatment in cold regions by overland flow. Marcid, C.J., et al., [1980, 149-1] CR 89-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1980, 73p-1] Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 0,620-6266] MP 1403 Structural evaluation of porous pavement in cold climate. Eaton, R.A., et al., [1980, 43p-1] SR 88-39	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Crashing ice forces on cylindrical structures. et al., [1984, p.1-9] MP 1773 Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] MP 1834 Grain size and the compressive strength of ice. Cole, D.M., MP 1834 Structure and the compressive strength of ice from pressure ridges. Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.99-102] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.465-475] MP 1878 Pressure ridge strength in the Beaufort Sea. (1985, p.167-172) Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251) MP 1878 MP 1936 Grain size and the compressive strength of ice. Cole, D.M., MP 1879 MP 1879 MP 1879 Confined compressive strength of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251) MP 1936 Grain size and the compressive strength of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251) MP 1936 Grain size and the compressive strength of multi-year pressure ridge samples. Cole, D.M., MP 1879 Confined compressive strength of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251) MP 1876 Richter-Menge, J.A., [1985, p.244-251) MP 1876 Richter-Menge, J.A., [1985, p.244-251) MP 1876 Richter-Menge, J.A., [1985, p.244-251) Richter-Menge, J.A., [1985, p.244-251] Richter-Menge, J.A., [1985, p.244-2	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Comercte admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete curing Detection of moisture in construction materials. Morey, R.M., et al., [1977, p.3] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Computer simulation of urban snow removal. Johnson, R., [1977, 13p.] SR 77-35 Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.] Common for structural concrete in cold regions. Johnson, R., [1977, 13p.]
Cold weather O&M. Reed, S.C., et al., [1985, p.10-15], MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2072 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933 Field performance of a subarctic utilidor. Reed, S.C., (1977, p.448-468) Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-11 Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1132 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1980, 73p.] SR 28-19 Structural evaluation of porous pavement in cold climate. Baton, R.A., et al., [1980, 643p.] Using electronic measurement equipment in winter. Atkins, R.T., [1981, 7p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.] CR 281-16 CR 281-16	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.) Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cole, D.M., MP 1838 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.46-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.46-488] Pressure ridge strength in the Beaufort Sea. Richter-Menge, J.A., [1985, p.244-251] MP 1878 Grain size and the compressive strength of ice. [1985, p.369-374] Confined compressive strength of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] MP 1936 Grain size and the compressive strength of ice. [1985, p.369-374] Confined compressive strength of multi-year pressure ridge samples. [208, D.M., MP 1907 Confined compressive strength of multi-year pressure ridge samples. [208, D.M., MP 1907 Confined compressive strength of multi-year pressure ridge samples. [208, D.M., MP 1907 Confined compressive strength of multi-year pressure ridge samples. [208, D.M., MP 1907 Confined compressive strength of multi-year pressure ridge samples. [208, D.M., MP 1907 Confined compressive strength of multi-year pressure ridge samples. [208, D.M., MP 1907 Confined compressive strength of multi-year pressure ridge samples. [208, D.M., MP 1907 Confined compressive strength of multi-year pressure ridge samples. [208, D.M., MP 1907 Confined compressive strength of multi-year pressure ridge samples. [208, D.M., MP 1907 Confined samples. [208, D.M., MP 1907 Confined samples. [208, D.M.,	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Computer model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Concrete simulations Cenerate structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete curing Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Computer distribution of reduce crecking on runways. Eaton, R.A., et al., [1981, 26p.] Fabric installation to reduce cracking on runways. Eaton, R.A., et al., [1981, 26p.] SR 81-10
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of wehicles. Hanamoto, B., [1976, p.121-140] Field performance of a subarctic utilidor. Read, S.C., (1977, p.448-468, MP 930 Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] Wastewater treatment in cold regions by overland flow Martel, C.J., et al., [1980, 14p.] Swatewater treatment in cold regions by overland flow Martel, C.J., et al., [1980, 14p.] Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 520-626] Structural evaluation of porous pavement in cold climate. Eaton, R.A., et al., [1980, 43p.] Using electronic measurement equipment in winter. Atkins, R.T., [1981, 7p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.] MP 2024 MP 2036 MP 2036 MP 2036 MP 930 Red, S.C., (1978, p.45) MP 1087 SR 80-19 Using electronic measurement equipment in winter. Atkins, R.T., [1981, 7p.] TD 81-01 Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.]	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen sit. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. MP 1773 Crushing ice forces on cylindrical structures. MP 1834 Orain size and the compressive strength of ice. Cole, D.M., I1985, p.220-226) Strength and modulus of ice from pressure ridges. Coz., G.F.N., et al., [1985, p.93-98] Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.99-102] MP 1848 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Coz., G.F.N., et al., [1985, p.466-475] MP 1878 Pressure ridge strength in the Beaufort Sea. [1985, p.466-48] MP 1879 Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251, MP 1212] Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251, MP 1936 Consiste and the compressive strength of ice. Cole, D.M., [1985, p.369-374] Confined compressive strength of multi-year pressure ridge samples. Cox, G.F.N., et al., [1986, p.365-373] MP 2035 Compressive deformation of columnar sea ice. Brown, R.J., [1985, p.741-252] MP 2124	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] CR 77-30 Finite element model of transient heat conduction. Guymon, C.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Concrete admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete carling Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 7
Cold weather O&M. Read, S.C., et al., [1985, p.10-15], MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933 Field performance of a subarctic utilidor. Read, S.C., [1977, p.448-468] Reffects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] MP 1087 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-11 Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1153 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] Operation of the CRREL prototype sit transportable shelter. Flanders, S.N., [1980, 73p.] Sgr 38-10 Sgructural evaluation of porous pavement in cold climate. Eaton, R.A., et al., [1980, 43p.] Sgr 88-39 Using electronic measurement equipment in winter. Atkins, R.T., [1981, 7p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.] CR 81-61 Mine/countermine problems during winter warfare. Lunardini, V.J., ed, [1981, 43p.] Shallow snow model for predicting vehicle performance.	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. MP 1773 Crushing ice forces on cylindrical structures. MP 1834 Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridge. Coa, G.F.N., et al., [1985, p.39-98] Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.476-488] Pressure ridge strength in the Beaufort Sea. MP 1878 Pressure ridge strength in the Beaufort Sea. MP 1878 Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-231] Confined compressive strength of co. [1985, p.365-373] MP 1997 Confined compressive strength of multi-year pressure ridge samples. Cox, G.F.N., et al., [1986, p.365-373] MP 2035 Compressive deformation of columnar sea ice. Brown, R.L., et al., [1986, p.241-252] Congressive strength of river ice jams. Tatinclaux, J.C.,	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] CR 77-36 Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Concrete simulatures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cencrete curtag Detection of moisture in construction materials. Morey, R.M., et al., [1977, 3p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. SR 77-35 Cencrete sarshility Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] CR 77-28 Pabric installation to reduce cracking on runways. Eaton, R.A., et al., [1981, 26p.] Cencrete heatting Regulated set concrete for cold weather construction. Sayles, F.H., et al., [1980, p.291-314] MP 1359
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.12-140] Field performance of a subarctic utilidor. Read, S.C., (1977, p.448-468, MP 930 Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] Wastewater treatment in cold regions by overland flow Martel, C.J., et al., [1980, 14p.] Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 43p.] Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 43p.] Spray application of or orous pavement in cold climate. Eaton, R.A., et al., [1980, 43p.] Using electronic measurement equipment in winter. Atkins, R.T., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 23p.] TD \$1-01 Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 23p.] Shallow anow model for predicting vehicle performance. Harrison, W.L., [1981, 21p.] CR \$1-20	Influence of grain size on the ductility of ice. [1984, p.150-157] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] MP 1686 Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] MP 1773 Crushing ice forces on cylindrical structures. MP 1834 Orain size and the compressive strength of ice. Cole, D.M., [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cox, G.F.N., et al., [1985, p.93-98] Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1848 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.476-488] MP 1879 Pressure ridge strength in the Beaufort Sea. [1985, p.167-172] Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] MP 1936 Orain size and the compressive strength of ice. Cole, D.M., [1985, p.369-374] Confined compressive strength of multi-year pressure ridge samples. Cox, G.F.N., et al., [1986, p.365-373] MP 2035 Compressive deformation of columnar sea ice. Brown, R.L., et al., [1986, p.241-252] MP 2124 Compressive strength Mechanics and hydraulica of river ice jams. Tatinclaux, J.C., et al., [1976, 979-) MP 1860	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] CR 77-30 Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1296 Cancrete admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38 Cements for structural concrete in cold regions. SR 77-38
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140,] MF 933 Fleid performance of a subarctic utilidor. Read, S.C., [1977, p.448-468,] MF 936 Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473,] MF 1087 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70,] MF 1152 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1980, 73p.] Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 9.620-626,] MF 1403 Structural evaluation of porous pavement in cold climate. Baton, R.A., et al., [1980, 43p.,] SR 80-39 Using electronic measurement equipment in winter. Atkins, R.T., [1981, 7p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.,] Shallow anow model for predicting vehicle performance. Harrison, W.L., [1981, 21p.] Case study of land treatment in a cold climate—West Dover, Vermont. Bouzoun, J.R., et al., [1982, 96p.]	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. MP 1773 Crushing ice forces on cylindrical structures. MP 1834 Grain size and the compressive strength of ice. Cole, D.M., Inc., p. 1985, p.220-226 Strength and modulus of ice from pressure ridges. Coa, G.F.N., et al., [1985, p.39-98] Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.466-485] Pressure ridge strength in the Beaufort Sea. MP 1877 Triaxial compressive strength of ice. Cox, G.F.N., et al., [1985, p.466-4251] MP 1879 MP 1879 MP 1879 MP 1879 MP 1879 MP 1879 Confined compressive strength of ice. Cole, D.M., MP 1935, p.369-374] Confined compressive strength of multi-year pressure ridge samples. Cox, G.F.N., et al., [1986, p.365-373, MP 2035 Compressive deformation of columnar sea ice. Brown, R.L., et al., [1986, p.241-252] MC et al., [1976, 97p.] Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] CR 77-03	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Concrete shalktures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete curing Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete sharkfury Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] CR 77-28 Pabric installation to reduce cracking on runways. Eaton, R.A., et al., [1981, 26p.] Concrete beating Regulated set concrete for cold weather construction. Sayles, F.H., et al., [1980, p.291-314] Concrete pavements Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140,] Field performance of a subarctic utilidor. Read, S.C., [1977, p.448-468, MP 930 Effects of subgrade preparation upon full depth perment performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 149-3 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 149-3 Wastewater treatment in cold regions by overland flow. Marcid, C.J., et al., [1980, 149-1] Wastewater treatment in cold regions by overland flow. Marcid, C.J., et al., [1980, 149-1] Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 149-1] Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 149-1] Spray application of porous pevement in cold climate. Raton, R.A., et al., [1980, 149-1] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p-1] TD 81-01 Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p-1] Miner countermine problems during winter warfare. Lunardini, V.J., ed, [1981, 43p-1] Shallow anow model for predicting vehicle performance. Harrison, W.L., [1981, 20p-1] Cose study of land treatment in a cold climate.—West Dover, Vermont. Bouzoun, J.R., et al., [1982, 96p-1]	Influence of grain size on the ductility of ice. [1984, p.150-157] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] MP 1686 Mechanical properties of multi-year sea ice. Testing techniques. Mellor, M., et al., [1984, 39p.] Crassing ice forces on cylindrical structures. [1984, p.3-15] MP 1773 Crushing ice forces on cylindrical structures. [1985, p.20-226] MP 1836 Grain size and the compressive strength of ice. [1985, p.220-226] MP 1838 Strength and modulus of ice from pressure ridges. Cox. [1985, p.39-398] MP 1848 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.465-488] MP 1879 Pressure ridge strength in the Beaufort Sea. [1985, p.465-488] MP 1879 Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] MP 1879 Confined compressive strength of multi-year pressure ridge samples. Cox, G.F.N., et al., [1986, p.365-373] MP 1936 Confined compressive strength of multi-year pressure ridge sea ice samples. Cox, G.F.N., et al., [1986, p.365-373] MP 1936 Compressive strength of columnar sea ice. Brown, R.L., MP 2035 Compressive strength metal compressive strength of frozen silt. Haynes, P.D., et al., [1976, 979.] MP 1860 Biffect of temperature on the strength of frozen silt. Haynes, P.D., et al., [1977, 279.] Messuring the uniaxial compressive strength of ice. Haynes, Hayn	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, C.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1298 Cancreta admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cancrete caring Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete darability Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] Concrete basting Regulated set concrete for cold weather construction. SR 81-10 Concrete basting Regulated set concrete for cold weather construction selected pavement materials. Minsk, L.D., [1979, p.51-88] MP 1238
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140, MP 933 Fleid performance of a subarctic utilidor. Read, S.C., (1977, p.448-468, MP 936) Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473) Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1152 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] CR 89-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1980, 73p.] Spray application of waste-water effluent in a cold climate. Casell, E.A., et al., [1980, 9.520-626) MP 1403 Structural evaluation of porous pavement in cold climate. Baton, R.A., et al., [1980, 43p.] SR 89-39 Using electronic measurement equipment in winter. Atkins, R.T., [1981, 7p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.] CR 81-16 Mine/countermine problems during winter warfare. Lunardini, V.J., ed, [1981, 43p.] Shallow anow model for predicting vehicle performance. Harrison, W.L., [1981, 21p.] CR 81-20 Case study of land treatment in a cold climate.—West Dover, Vermont. Bouzoun, J.R., et al, [1982, 96p.] CR 82-24 Optical engineering for cold environments. Aitien, G.W., ed, [1983, 225p.]	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen sit. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. MP 1773 Crushing ice forces on cylindrical structures. MP 1834 Grain size and the compressive strength of ice. Cole, D.M., [1985, p.220-226] Strength and modulus of ice from pressure ridges. Cox, G.F.N., et al., [1985, p.93-98] Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.99-102] MP 1848 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.99-102] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.466-475] MP 1878 Pressure ridge strength in the Beaufort Sea. [1985, p.476-488] MP 1879 Pressure ridge strength of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] Mchanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] MP 1936 Compressive deformation of columnar sea ice. Richter-Menge, J.A., [1985, p.244-251] Compressive deformation of columnar sea ice. Survun, R.J. [1986, p.365-373] MP 2035 Compressive deformation of river ice jams. Tatinclaux, J.C., et al., [1976, 97p.] Messuring the uniaxial compressive strength of frozen sitt. Haynes, P.D., et al., [1977, 27p.] Messuring the uniaxial compressive strength of ice. Haynes, P.D., et al., [1977, 27p.] MP 1827 Unconfined compression tests on snow: a comparative study.	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP \$57 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] CR 77-30 Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Cancrete admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cancrete carriag Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35 Cements for structural concrete in cold regions. SR 77-35
Cold weather O&M. Reed, S.C., et al., [1985, p.10-15] MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2074 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cald weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933 Fleid performance of a subarctic utilidor. Reed, S.C., [1977, p.448-468] Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] MP 1087 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-11 Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1183 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1981, 79.] SR 80-19 Syray application of waste-water effluent in a cold climate. Caseell, E.A., et al., [1980, p.620-626] MP 1403 Structural evaluation of porous pavement in winter. Atkins, R.T., [1981, 7p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.] CR 81-91 Mine/countermine problems during winter warfare. Lunardini, V.J., ed, [1981, 43p.] SR 81-20 Case study of land treatment in a cold climate—West Dover, Vermont. Bouzoun, J.R., et al., [1982, 96p.] CR 82-44 Optical engineering for cold environments. Aitken, G.W.,	Influence of grain size on the ductility of ice. [1984, p.150-157] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] MP 1686 Mechanical properties of multi-year sea ice. Testing techniques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] MP 1773 Crushing ice forces on cylindrical structures. MP 1836 Grain size and the compressive strength of ice. Cole, D.M., [1985, p.220-226] Strength and modulus of ice from pressure ridges. Coz., G.F.N., et al., [1985, p.99-102] MP 1836 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.465-488] Pressure ridge strength in the Beaufort Sea. MP 1878 Pressure ridge strength in the Beaufort Sea. Weeks, W.P., [1985, p.167-172] Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] MP 1936 Grain size and the compressive strength of ice. Cole, D.M., [1985, p.369-374] Confined compressive strength of multi-year pressure ridge semples. Cox, G.F.N., et al., [1986, p.365-373] MP 1936 Compressive deformation of columnar sea ice. Brown, R.L., et al., [1986, p.241-252] Compressive strength Mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al., [1976, 97p.] MP 1030 MP 1040 MP 1050 MP 1050 MP 2031 Compressive strength Mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al., [1976, 97p.] MP 1060 Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] MP 1027 Unconfined compression tests on snow: a comparative study. Kovaca, A., et al., [1977, 27p.] SR 77-20	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Computer model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Concrete samiltures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete curfus Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Computer darability Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] Concrete bastlag Regulated set concrete for cold weather construction. Sayles, F.H., et al., [1980, p.291-314] MP 1359 Concrete pavements Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-38] Detection of cavities under concrete pavement. Kovacs, A.,
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933 Field performance of a subarctic utilidor. Read, S.C., (1977, p.448-468, MP 936 Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1152 Wastewater treatment in cold regions by overland flow Martel, C.J., et al., [1980, 14p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., (1980, 73p.) Structural evaluation of porous pavement in cold climate. Cassell, E.A., et al., [1980, 43p.] SR 80-39 Using electronic measurement equipment in winter. Atkins, R.T., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Planders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter	ridges. Richter, J.A., et al. [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al. [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al. [1984, p.3-15] Crushing ice forces on cylindrical structures. MP 1773 Crushing ice forces on cylindrical structures. MP 1834 Grain size and the compressive strength of ice. Cole, D.M., [1985, p.220-226] Strength and modulus of ice from pressure ridges. Coz., G.F.N., et al., [1985, p.93-98] Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1848 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.476-488] Pressure ridge strength in the Beaufort Sea. [1985, p.167-172] Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] Grain size and the compressive strength of ice. Cole, D.M., [1985, p.369-374] Confined compressive strength of multi-year pressure ridge samples. Cox, G.F.N., et al., [1986, p.365-373] MP 1937 Compressive deformation of columnar sea ice. Brown, R.L., et al., [1976, 979.] MP 2035 Compressive deformation of river ice jams. Tatinclaux, J.C., et al., [1977, 27p.] MP 1849 Compressive strength Mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al., [1977, 27p.] MP 1936 MP 1937 Compressive and shear strength of frozen silt. Haynes, P.D., et al., [1977, 27p.] Compressive and stear strengths of fragmented ice covers. Cheng, S.T., et al., [1977, 27p.] Compressive and shear strengths of fragmented ice covers. Cheng, S.T., et al., [1977, 27p.] Compressive and shear strengths of fragmented ice covers.	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Concrete schultures Coments for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete surshifty Precze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] Concrete straig Regulated set concrete for cold weather construction. Sayles, F.H., et al., [1980, p.291-314] Concrete beating Regulated set concrete for cold weather construction. Sayles, F.H., et al., [1980, p.291-314] Concrete pavements Preczing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] Concrete pavements Preczing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-58] Detection of cavities under concrete pavement. ct al., [1983, 41p.] Concrete places
Cold weather O&M. Reed, S.C., et al., [1985, p.10-15] MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2032 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Rifect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933 Field performance of a subarctic utilidor. Reed, S.C., (1977, p.448-468) Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1132 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1980, 73p.] SR 89-19 Syray application of waste-water effluent in a cold climate. Eaton, R.A., et al., [1980, 620-626] MP 140. Structural evaluation of porous pavement in cold climate. Baton, R.A., et al., [1980, 43p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.] CR 81-16 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Shallow anow model for predicting vehicle performance. CR 81-16 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Case study of land treatment in a cold climate—West Dover, Vermont. Bouzoun, J.R., et al., [1982, 96p.] CR 82-44 Optical engineering for cold environments. Aitken, O.W., ed., [1983, 225p.] Wellshy services for remote military facilities. Reed, S.C., et al., [1984, 66p.] Welther of the cold environments. Aitken, O.W., ed., [1983, 225p.] Wellshy services for remote military facilit	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mcchanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. et al., [1984, p.1-9] Grain size and the compressive strength of ice. [1985, p.220-226] Strength and modulus of ice from pressure ridges. Coz., G.F.N., et al., [1985, p.99-102] MP 1836 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.465-485] Pressure ridge strength in the Beaufort Sea. Weeks, W.P., [1985, p.167-172] Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] Grain size and the compressive strength of ice. Coke, D.M., [1985, p.369-374] Confined compressive strength of multi-year pressure ridge samples. Cox, G.F.N., et al., [1986, p.365-375] MP 1936 Compressive deformation of columnar sea ice. Brown, R.L., et al., [1986, p.241-252] Compressive strength Mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al., [1976, 97p.] MP 2035 Compressive strength Mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al., [1976, 97p.] MP 1060 Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] MP 1027 Unconfined compression tests on snow: a comparative study, Kovaca, A., et al., [1977, 27p.] SR 77-20 Compressive and shear strengths of fragmented ice covers. MP 951 Attal double point-load tests on snow and ice. Kovaca, A., et al., [1977, 27p.] MP 1977	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] CR 77-30 Finite element model of transient heat conduction. Guymon, O.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Cancrete admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cancrete carking Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold weather construction. Sayles, F.H., et al., [1980, p.291-314) Concrete beating Regulated set concrete for cold weather construction. Sayles, F.H., et al., [1980, p.291-314) Cencrete prevenents Freezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-58] Detection of cavities under concrete pavement. Kovaca, A., et al., [1983, 41p.] Cancrete pavements Freezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-58] Salt action on concrete. Sayward, J.M., [1984, 69p.] SR 84-25 Concrete placing Cold weather construction materials: Part 2—Regulated-set competing field validation of
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cold weather performance Effect of snow cover on obstacle performance of wehicles. Hanamoto, B., [1976, p.12-140, MP 933 Field performance of a subarctic utilidor. Read, S.C., (1977, p.448-468, MP 930 Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473, MP 1087 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1152 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1980, 73p.] SR 80-10 Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 14p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., (1980, 73p.) SR 80-10 Spray application of waste-water effluent in a cold climate. Cassell, E.A., et al., [1980, 14p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., (1981, 21p.) CR 81-16 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] SR 81-20 Shallow snow model for predicting vehicle performance. Harrison, W.L., [1981, 21p.] Case study of land treatment in a cold climate.—West Dover, Vermont. Bouzoun, J.R., et al., [1982, 96p.] CR 82-44 Optical engineering for cold environments. Aithen, G.W., ed., (1983, 225p.) MP 1646 Utility services for remote military facilities. Reed, S.C., et al., [1984, 9p., 1 SR 85-11 SR 85-11	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. [1984, p.1-9] Crushing ice forces on cylindrical structures. [1985, p.20-226] Strength and modulus of ice from pressure ridges. Coz., G.F.N., et al., [1985, p.93-98] Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1848 Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.476-488] Pressure ridge strength in the Beaufort Sea. [1985, p.167-172] Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] Grain size and the compressive strength of ice. [1985, p.369-374] Confined compressive strength of multi-year pressure ridge sea ice samples. Cox, G.F.N., et al., [1986, p.365-373) MP 1936 Compressive deformation of columnar sea ice. Brown, R.L., et al., [1986, p.365-373) MP 2035 Compressive strength Mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al., [1976, 979.] Messuring the uniaxial compressive strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al., [1977, 27p.] Messuring the uniaxial compressive strength of oragmented ice covers. Cheng, S.T., et al., [1977, 27p.] MP 1027 Compressive and shear strength of fragmented ice covers. Cheng, S.T., et al., [1977, 27p.] Compressive and shear strength of ompressive strength of ice. Covers. A., (1978, 11p.) Incressing the effectiveness of soil compaction at below-freez-	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP \$57 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Finite element model of transient heat conduction. Guymon, C.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1298 Concrete admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete caring Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Comments for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete surability Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] Concrete surability Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] Concrete basting Regulated set concrete for cold weather construction. MP 1359 Concrete pavements Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-38] Detection of cavities under concrete pavement. Covac, A., et al., [1981, 41p.] Signature part of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-38] Salt action on concrete. Sayward, J.M., [1984, 69p.] Signature part of liquid deicing, chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-38] Salt action on concrete. Sayward, J.M., [1984, 69p.] Signature part of liquid deicing, chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-38] Salt action on concrete. Sayward, J.M., [1984, 69p.] Signature part of liquid deicing, chemicals on selected pavement materials; Part 2—Regul
Cold weather O&M. Read, S.C., et al., [1985, p.10-15, MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2074 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2135 Cald weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140,] MP 933 Fleid performance of a subarctic utilidor. Read, S.C., (1977, p.448-468, p.121-140,] Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473, p.473, p.	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozen silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. MP 1773 Crushing ice forces on cylindrical structures. MP 1834 Orain size and the compressive strength of ice. Cole, D.M., [1985, p.220-226] Strength and modulus of ice from pressure ridges. Coa, G.F.N., et al., [1985, p.93-98] Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1848 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.466-485] MP 1877 Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.466-485] MP 1879 Pressure ridge strength in the Beaufort Sea. MP 1879 Richter-Menge, J.A., [1985, p.244-251] Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] Crain size and the compressive strength of ice. Cole, D.M., [1985, p.369-374] Confined compressive strength of multi-year pressure ridge samples. Cox, G.F.N., et al., [1986, p.365-373] MP 1907 Confined compressive strength of frozen silt. MP 2035 Compressive deformation of columnar sea ice. Brown, R.L., et al., [1976, 97p.] Measuring the uniaxial compressive strength of fozen silt. Haynes, P.D., et al., [1977, 27p.] Measuring the uniaxial compressive strength of frozen silt. Haynes, P.D., et al., [1977, 27p.] Measuring the uniaxial compressive strength of fragmented ice covers. Cheng. S.T., et al., [1977, 27p.] Measuring the uniaxial compressive strength of fragmented ice covers. Cheng. S.T., et al., [1977, 27p.] Action of the duction of the properties o	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] CR 77-30 Finite element model of transient heat conduction. Guymon, O.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] Cancrete admixtures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cancrete carking Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Cements for structural concrete in cold weather construction. Sayles, F.H., et al., [1980, p.291-314) Concrete beating Regulated set concrete for cold weather construction. Sayles, F.H., et al., [1980, p.291-314) Cencrete prevenents Freezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-58] Detection of cavities under concrete pavement. Kovaca, A., et al., [1983, 41p.] Cancrete pavements Freezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-58] Salt action on concrete. Sayward, J.M., [1984, 69p.] SR 84-25 Concrete placing Cold weather construction materials: Part 2—Regulated-set competing field validation of
Cold weather O&M. Reed, S.C., et al., [1985, p.10-15] MP 2070 Cold factor. Abele, G., [1985, p.480-481] MP 2024 Cold climate utilities manual. Smith, D.W., ed., [1986, var.p.] MP 2035 Cold weather performance Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933 Field performance of a subarctic utilidor. Reed, S.C., [1977, p.448-468] Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-473] MP 1087 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Performance of overland flow land treatment in cold climates. Jenkins, T.F., et al., [1978, p.61-70] MP 1132 Wastewater treatment in cold regions by overland flow. Martel, C.J., et al., [1980, 14p.] CR 80-07 Operation of the CRREL prototype sir transportable shelter. Flanders, S.N., [1981, 1980, p.620-626] MP 1403 Structural evaluation of porous pavement in cold climate. Baton, R.A., et al., [1980, p.620-626] MP 1403 Structural evaluation of porous pavement in winter. Atkins, R.T., [1981, 7p.] Cold regions testing of an air-transportable shelter. Flanders, S.N., [1981, 20p.] CR 81-91 Mine/countermine problems during winter warfare. Lunardini, V.J., ed, [1981, 43p.] SR 81-20 Shallow snow model for predicting vehicle performance. Harrison, W.L., [1981, 21p.] Case study of land treatment in a cold climate—West Dover, Vermont. Bouzoun, J.R., et al., [1982, 96p.] CR 82-44 Optical engineering for cold environments. Aitken, G.W., ed, [1983, 225p.] Willey services for remote military facilities. Reed, S.C., et al., [1984, 49p. + flgs.] When the december of the statement in cold climates. Reed, S.C., et al., [1985, 49p.] SR 85-10 Winter tire tessu: 1980-81. Blaisdell, G.L., et al., [1985, 58p.] Winter tire tessu: 1980-81. Blaisdell, G.L., et al., [1985, 58p.]	ridges. Richter, J.A., et al., [1984, p.140-144] MP 1685 Influence of grain size on the ductility of ice. [1984, p.150-157] Mechanical properties of multi-year sea ice. niques. Mellor, M., et al., [1984, 39p.] Compressive strength of frozon silt. Zhu, Y., et al., [1984, p.3-15] Crushing ice forces on cylindrical structures. MP 1773 Crushing ice forces on cylindrical structures. MP 1834 Grain size and the compressive strength of ice. Cole, D.M., [1985, p.220-226] Strength and modulus of ice from pressure ridges. Coa, G.F.N., et al., [1985, p.39-98] Structure and the compressive strength of ice from pressure ridges. Richter, J.A., et al., [1985, p.99-102] MP 1849 Compressive strength of pressure ridge ice samples. Richter-Menge, J.A., et al., [1985, p.465-475] Triaxial compression testing of ice. Cox, G.F.N., et al., [1985, p.476-488] Pressure ridge strength in the Beaufort Sea. MP 1878 Pressure ridge strength in the Beaufort Sea. MP 1878 MP 1879 Mechanical properties of multi-year pressure ridge samples. Richter-Menge, J.A., [1985, p.244-251] Crain size and the compressive strength of ice. Cole, D.M., [1985, p.369-374] Confined compressive strength of multi-year pressure ridge samples. Cox, G.F.N., et al., [1986, p.365-373] MP 1907 Compressive deformation of columnar sea ice. Brown, R.L., et al., [1976, 97p.] Messuring the uniaxial compressive strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] Messuring the uniaxial compressive strength of fragmented ice covers. Cheng. S.T., et al., [1977, 27p.] Messuring the uniaxial compressive strength of fragmented ice covers. Cheng. S.T., et al., [1977, 27p.] Messuring the uniaxial compressive strength of comparative study. Kovacs, A., et al., [1977, 27p.] Messuring the uniaxial compressive strength of comparative study. Kovacs, A., et al., [1977, 27p.] Messuring the uniaxial compressive strength of comparative study. Kovacs, A., et al., [1977, 27p.] Messuring the uniaxial compressive strength of comparative study. Repressive strength of	Computer simulation of the anowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715] MP 857 Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971 Computer model of municipal snow removal. Tucker, W.B., [1977, 7p.] Computer model of transient heat conduction. Guymon, G.L., et al., [1977, 167p.] SR 77-38 Bubbler induced melting of ice covers. Keribar, R., et al., [1978, p.362-366] Computer simulation of urban snow removal. Tucker, W.B., et al., [1979, p.293-302] Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1238 Concrete samiltures Cements for structural concrete in cold regions. Johnson, R., [1977, 13p.] Concrete curfug Detection of moisture in construction materials. Morey, R.M., et al., [1977, 9p.] Computer darability Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.] Concrete bastlag Regulated set concrete for cold weather construction. Sayles, F.H., et al., [1980, p.291-314] Concrete pavements Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-38] Salt action on concrete. Sayward, J.M., [1984, 69p., SR 84-25] Concrete parements Cold weather construction materials: Part 2—Regulated-set cement for cold weather concreting, field validation of laboratory tests. Houston, B.J., et al., [1981, 33p.] MP 1466

Concrete strength (cont.) Regulated set concrete for cold weather construction.	Boundary integral equation solution for phase change prob- lems. O'Neill, K., (1983, p.1825-1850) MP 2093	Creep Isua, Greenland: glacier freezing study. Ashton, G.D.
Sayles, F.H., et al, [1980, p.291-314] MP 1359	Computation of porous media natural convection flow and	(1978, p.256-264) MP 117
Structural evaluation of porous pavement in cold climate. Eaton, R.A., et al., [1980, 43p.] SR 80-39	phase change. O'Neill, K., et al, [1984, p.213-229] MP 1895	Application of the Andrade equation to creep data for ice an frozen soil. Ting, J.M., et al, [1979, p.29-36]
Pabric installation to reduce cracking on runways. Eaton,	Experiments on thermal convection in snow. Powers, D., et	MP 180
R.A., et al, [1981, 26p.] SR 81-10 Cold weather construction materials: Part 2—Regulated-set	al, [1985, p.43-47] MIP 2006 Theory of natural convection in snow. Powers, D., et al,	Creep model for constant stress and constant strain rate Fish, A.M., [1984, p.1009-1012] MIP 176
coment for cold weather concreting, field validation of	[1985, p.10,641-10,649] MP 1957	Creep of a strip footing on ice-rich permafrost. Sayles, F.H.
laboratory tests. Houston, B.J., et al, [1981, 33p.] MP 1466	Conversion tables	[1985, p.29-51] MP 173
Deteriorated concrete panels on buildings at Sondrestrom,	Improved millivolt-temperature conversion tables for copper constantan thermocouples. 32F reference temperature.	Creep properties Thermal and creep properties for frozen ground construction
Greenland. Korbonen, C., (1984, 11p.) SR 84-12 Concrete structures	Stallman, P.B., et al, [1976, 66p.] SR 76-18	Sanger, F.J., et al., [1978, p.95-117] MP 162
Deteriorated concrete panels on buildings at Sondrestrom,	Cooling Performance of a thermosyphon with an inclined evaporator	Thermal and creep properties for frozen ground construction Sanger, F.J., et al., (1979, 311-337) MP 122
Greenland. Korhonen, C., [1984, 11p.] SR 84-12 Brittleness of reinforced concrete structures under arctic con-	and vertical condenser. Zarling, J.P., et al, [1984, p.64-68] MP 1677	Crovasses
ditions. Kivekss, I, et al, [1985, 28 + 14p.]	Heating and cooling method for measuring thermal conduc-	Small-scale strain measurements on a giacier surface. Co beck, S.C., et al, [1971, p.237-243] MIP 99
MP 1969	tivity. McGaw, R., [1984, 8p.] MP 1891	Depth of water-filled crevasses of giaciers. Weertman, J
Condensation control in low-slope roofs. Tobiasson, W.,	Laboratory tests and analysis of thermosyphone with inclined evaporator sections. Zarling, J.P., et al, [1985, p.31-37]	[1973, p.139-145] MP 104 Depth of water-filled crevases that are closely spaced. Rol
[1985, p.47-59] MIP 2039 Vapor drive maps of the U.S.A. Tobiasson, W., et al, [1986,	MP 1653	in, G. de Q., et al, [1974, p.543-544] MIP 103
7p. + graphs; MIP 2041	Cooling rate Temperature effects in compacting an asphalt concrete over-	leeberg thickness and crack detection. Kovacs, A., 1978, p.131-145; MP 113
Conduction Soil hydraulic conductivity and moisture retention features.	lay. Baton, R.A., et al, [1978, p.146-158] MIP 1063	Modified theory of bottom crevases. Jezek, K.C., [1984]
Ingersoil, J., (1981, 11p.) SR 81-62	Pieid cooling rates of asphalt concrete overlays at low temper- atures. Eston, R.A., et al, (1980, 11p.) CE 86-36	p.1925-1931; MP 206 Cryshiology
Conservation Reserve serverenties in buildings - Ledberton C.B. (1976)	Cooling systems	See ice and ice algae relationships in the Weddell Ses. Acl
Energy conservation in buildings. Ledbetter, C.B., 1976, 8p., SR 76-17	Ice engineering complex adopts heat pump energy system. Asmot, H.W.C., [1977, p.25-26] MF 893	ley, S.P., et al, [1978, p.70-71] MIP 126 Standing crop of algae in the see ice of the Weddell See region
Construction	Experimental scaling study of an annular flow ice-water heat	Ackley, S.F., et al, [1979, p.269-281] MIP 124
Haines-Pairbanks pipeline: design, construction and opera- tion. Garfield, D.E., et al, [1977, 20p.] SR 77-64	sink. Stubstad, J.M., et al, [1977, 54p.] CR 77-15 Some experiences with tunnel entrances in permafrost. Li-	Choanoflagellata from the Weddell Sea, summer 197 Buck, K.R., [1980, 26p.] CR 88-1
Haul Road performance and associated investigations in Alas-	nell, K.A., et al, [1978, p.813-819] MIP 1107	Physical mechanism for establishing algal populations in fras
ka. Berg, R.L., [1980, p.53-100] MIP 1351 Revegetation along roads and pipelines in Alaska. Johnson,	Waste heat utilization through soil heating. McFadden, T., et al, [1980, p.105-120] MP 1363	ice. Garrison, D.L., et al, [1983, p.363-365]
L.A., (1980, p.129-150) MIP 1353	et ai, [1980, p.105-120] MIP 1363 Core samplers	Relative abundance of diatoms in Weddell See pack io
Environmental engineering, Yukon River-Prudhoe Bay Haul Road. Brown, J., ed. (1980, 187p.) CR 88-19	Subsurface explorations in permafrost areas. Cass, J.R., Jr.,	Clarke, D.B., et al, 1983, p.181-182; MP 178 Sea ice and biological activity in the Antarctic. Clarke, D.B
Environment of the Alaskan Haul Road. Brown, J., [1980,	[1959, p.31-41] MIP 885 Drilling and coring of frozen ground in northern Alaska,	et al, [1984, p.2087-2095] MP 170
p.3-52 ₁ MP 1350 Construction costs	Spring 1979. Lawson, D.B., et al. (1980, 140.)	Sea ice microbial communities in Antarctics. Garrison D.L., et al, [1986, p.243-250] MP 262
Life-cycle cost effectiveness of modular megastructures in	SR 90-12 Correction	D.L., et al, [1986, p.243-250] MP 202 Cryegoule processes
cold regions. Wang, L.RL., et al, (1976, p.760-776) MP 892	Salt action on concrete. Sayward, J.M., (1984, 69p.)	Morphology of the North Slope. Walker, H.J., [1973, p.49- 52] MP 100
Construction equipment	Sh 84-25 Cost analysis	52 ₃ MF 106 Cryogonic solls
Specialized pipeline equipment. Hanamoto, B., [1978, 30p.]	Propane dispenser for cold fog dissipation system. Hicks,	Bibliography of soil conservation activities in USSR perma
Construction equipment problems and procedures: Alaska	J.R., et al, [1973, 38p.] MP 1033 Management of power plant waste heat in cold regions. As-	frost areas. Andrews, M., [1977, 116p.] SR 77-4 Antarctic soil studies using a scanning electron microscop
pipeline project. Hanamoto, B., [1978, 14p.]	mot, H.W.C., [1975, p.22-24] MP 942	Antarctic soil studies using a scanning electron microscop Kumsi, M., et al. (1978, p.106-112) MP 138
Excavation of frozen materials. Moore, H.E., et al. [1980,	Protected membrane roofs in cold regions. Asmot, H.W.C.,	Bibliography of permafrost soils and vegetation in the USSI Andrews, M., [1978, 175p.] SR 78-1
p.323-345 ₁ MP 1360 Construction materials	et al, [1976, 27p.] CR 76-62 Evaluation of an air cushion vehicle in Northern Alaska.	Crystal ericatation
Detection of moisture in construction materials. Morey,	Abele, G., et al, [1976, 7p.] MCP 894	Structural growth of lake ice. Gow, A.J., et al., [1977, 24p.] CR 77-6
R.M., et al, [1977, 9p.] CR 77-25 Remote sensing for reconnaissance of proposed construction	Long distance heat transmission with steam and hot water. Aamot, H.W.C., et al, (1976, 39p.) MP 938	Crystal study techniques
site. McKim, H.L., et al., (1978, 9 leaves) MP 1167	Some economic benefits of ice booms. Perham, R.E.,	Producing strain-free flat surfaces on single crystals of icomments. Tobin, T.M., [1973, p.519-520]
Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] SR 78-24	[1977, p.570-591] MP 989 Waste heat recovery for building heating. Sector, P.W.,	MP 100
Mechanical properties of frozen ground. Ladanyi, B., et al.	[1977, 24p.] SR 77-11	Cubic ice Abnormal internal friction peaks in single-crystal ice. Stal
(1979, p.7-18 ₁ MP 1726 Time constraints on measuring building R-values. Flanders,	Installation of loose-laid inverted roof system at Fort Wainwright, Alaska. Schaefer, D., [1977, 27p.] SR 77-18	man, P.E., et al, [1977, 15p.] SR 77-2
S.N., [1980, 30p.] CR 80-15	Investigation of ice clogged channels in the St. Marys River.	Calverts
Remote sensing for earth dam site selection and construction materials. Merry, C.J., et al, [1980, p.158-170]	Mellor, M., et al. [1978, 73p.] MP 1170 Cost-effective use of municipal wastewater treatment ponds.	Ice-blocked drainage: problems and processes. Carey, K.L [1983, 9p.] TD 83-6
MP 1316	Reed, S.C., et al, [1979, p.177-200] MIP 1413	Solving problems of ice-blocked drainage. Carey, K.L. [1984, 9p.]
Resins and non-portland cements for construction in the cold. Johnson, R., [1980, 19p.] SR 80-35	Cost of land treatment systems. Reed, S.C., et al, [1979, 135p.] NP 1387	(1984, 9p.) TD 84-6 Cutting tools
Cold weather construction materials; Part 2—Regulated-set	Cost of ice damage to shoreline structures during navigation.	Kinematics of continuous belt machines. Mellor, M
cement for cold weather concreting, field validation of laboratory tests. Houston, B.J., et al, [1981, 33p.]	Carey, K.L., [1980, 33p.] SR 88-22 Least life-cycle costs for insulation in Alaska. Flanders,	[1976, 24p.] CR 76-1 Kinematics of axial rotation machines. Mellor, M., [1976,
MP 1466 Building materials and acid precipitation. Merry, C.J., et al,	S.N., et al, [1982, 47p.] CR 82-27	45p. ₁ CM 76-1
[1985, 40p.] SR 85-01	Simple design procedure for hest transmission system piping. Phetteplace, G.B., [1985, p.1748-1752] MP 1942	Damage Ecological effects of oil spills and seepages in cold-dominate
Structure data bases for predicting building material distribu- tion. Merry, C.J., et al, [1985, 35p.] SR 85-07	Countermeasures	environments. McCown, B.H., et al., [1971, p.61-65, MP 96
Description of the building materials data base for New	Ice fog suppression using monomolecular films. McFadden, T., (1977, p.361-367) MP 956	Effects of hovercraft, wheeled and tracked vehicle traffic o
Haven, Connecticut. Merry, C.J., et al, [1985, 129p.] SR 85-19	Fabric installation to reduce cracking on runways. Eaton,	tundra. Abele G. r1976 p.186-215: MP 112
Models for predicting building material distribution in NE	R.A., et al, [1981, 26p.] SR 81-10	De-icing using lasers. Lane, J.W., et al. [1976, 25p.] CR 76-1
cities. Merry, C.J., et al, [1985, 50p.] SR 85-24 Construction engineering community: materials and diagnos-	Stabilizing fire breaks in tundra vegetation. Patterson, W.A., III, et al, [1981, p.188-189] MP 1804	Air-cushion vehicle effects on surfaces of Alaska's Arcti
tica. [1986, 54p.] SR 66-01	Crack propagation	Slopes. Slaughter, C.W., [1976, p.272-279] MIP 138
Construction materials data base for Pittsburgh, PA. Merry, C.J., et al, [1986, 87p.] SR 86-68	Mechanisms of crack growth in quartz. Martin, R.J., III, et al., [1975, p.4837-4844] MP 355	Vehicle damage to tundra soil and vegetation. Walker, D.A.
Continuous belt machines	Resistance of elastic rock to the propagation of tensile cracks.	et al. (1977, 49p.) SE 77-1 Effects of low ground pressure vehicle traffic on tundra a
Kinematics of continuous belt machines. Mellor, M., [1976, 24p.] CR 76-17	Peck, I., et al. (1985, p.7827-7836) MP 2052 Cracking (fracturing)	Lonely, Alaska. Abele, G., et al, [1977, 32p.]
Continuous permafrost	Thermal and load-associated distress in pavements. John-	SR 77-3 Second progress report on oil spilled on permafrest. McPad
Permafrost and active layer on a northern Alaskan road.	son, T.C., et al, [1978, p.403-437] MP 1209	den, T., et al, [1977, 46p.] SE 77-4
Berg, R.L., et al, [1978, p.615-621] MP 1102 Bibliography of permafrost soils and vegetation in the USSR.	Asphalt concrete for cold regions. Dempsey, B.J., et al, [1980, 55p.] CR 80-65	Inundation of vegetation in New England. McKim, H.L., e al, 1978, 13p.; MP 116
Andrews, M., [1978, 175p.] SR 78-19	Acoustic emission and deformation response of finite ice	1977 tundra fire at Kokolik River, Alaska. Hall, D.K., et a
Convection Heat transfer over a vertical melting plate. Yen, YC., et al,	plates Xirouchakis, P.C., et al, [1981, p.123-133] MP 1436	[1978, 11p.] SR 78-1 Effects of winter military operations on cold regions terrain
[1977, 12p.] CR 77-32	Fabric installation to reduce cracking on runways. Baton,	Abele, G., et al, (1978, 34p.) SR 76-1
Pres convection heat transfer characteristics in a melt water layer. Yen, YC., [1980, p.550-556] MIP 1311	R.A., et al, [1981, 26p.] SR \$1-19 Cracks	Effects of low ground pressure vehicle traffic on tundr Abele, G., et al., [1978, 63p.] SR 78-1
Transport equation over long times and large spaces. O'Neill, K., (1981, p.1665-1675) MIP 1497	Firm quake (a rare and poorly explained phenomenon). Den-	Undersea pipelines and cables in polar waters. Mellor, M
frant betone tain! Int. [43]	Hartog, S.L., [1982, p.173-174] MP 1571	[1978, 34p.] CR 78-2

Crude oil spills on black spruce forest. Jenkins, T.F., et al., [1978, p.305-323] MP 1185	Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] MP 1598	Sediment load and channel characteristics in subarctic upland catchments. Slaughter, C.W., et al. [1981, p.39-48]
Bibliography of permafrost soils and vegetation in the USSR. Andrews, M., (1978, 175p.) SR 78-19	Bouth hear Growth of faceted crystals in a snow cover. Colbeck, S.C.,	MP 1518 Runoff from a small subarctic watershed, Alaska. Chacho, E.F. et al. ri983, p.115-120; MP 1654
Tundra recovery since 1949 near Fish Creek, Alaska. Law- son, D.B., et al. [1978, 81p.] CR 78-28	(1982, 19p.) CR 62-29 Design	E.F., et al., 1983, p.115-120; MP 1654 Mitigative and remedial measures for chilled pipelines in discontinuous permafrost. Sayles, F.H., 1984, p.61-62;
Physical and thermal disturbance and protection of perma- frost. Brown, J., et al., [1979, 42p.] SE 79-65	Architectural programming: Making socially responsive ar- chitecture more accessible. Ledbetter, C.B., [1978, 79.] SR 78-02	MP 1974 Dialocations (materials)
Cost of ice damage to shoreline structures during navigation. Carry, K.L., [1980, 33p.] Six 66-22	Some aspects of Soviet trenching machines. Mellor, M.,	Dielectric properties of dislocation-free ice. Itagaki, K., [1978, p.207-217] MP 1171
Riffects of a tundra fire on soil and vegetation. Racine, C., [1980, 21p.] SR 80-37	Design criteria	X-ray measurement of charge density in ice. Itanki, K., [1978, 12p.] CR 79-25
Crude oil spills on subarctic permafrost in interior Alaska. Johnson, L.A., et al., [1980, 67p.] Pothole primer; a public administrator's guide to understand-	Snow load design criteria for the United States. Tobiasson, W., et al, (1976, p.70-72) MP 947	Charged dislocation in ice. 2. Contribution of dielectric relaxation. Itagaki, K., [1982, 15p.] CR 82-87
ing and managing the pothole problem. Baton, R.A., coord, (1981, 24p.)	Bibliography on harbor and channel design in cold regions. Haynes, F.D., [1976, 32p.] CR 76-03 Detection	Decks Lee engineering. O'Steen, D.A., [1980, p.41-47]
Boological impact of vehicle traffic on tundra. Abele, G., 1981, p.11-37, MP 1463	Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al, (1978, p.A9-A15)	Doped for
Surface disturbance and protection during economic develop- ment of the North. Brown, J., et al, [1981, 88p.] MP 1467	MP 1213 Research on roof moisture detection. Tobiasson, W., et al,	Properties of urea-doped ice in the CRREL test basin. Hirayama, K., (1983, 44p.) CR 83-08
Alaska Good Friday earthquake of 1964. Swinzow, G.K.,	[1978, 6p.] SR 78-29 Bibliography on techniques of water detection in cold regions.	Drainage Topological properties of some trellis pattern channel net-
[1982, 26p.] CR 82-01 Potholes: the problem and solutions. Baton, R.A., [1982,	Smith, D.W., comp. [1979, 75p.] Sm 79-19 Detection of Arctic water supplies with geophysical tech-	works. Mock, S.J., (1976, 54p.; CR 76-46 Roof loads resulting from rain-on-snow. Colbeck, S.C.,
p. 160-162 ₃ MP 1504 Effects of inundation on six varieties of turfgrass. Erbisch, F.H., et al., 1982, 25p.; SR 82-12	niques. Arcone, S.A., et al, (1979, 30p.) CR 79-15 Roof moisture survey. Korhonen, C., et al, (1980, 31p.)	[1977, 19p.] CR 77-12 Storm drainage design considerations in cold regions.
F.H., et al, [1982, 25p.] SR 82-12 Engineer's pothole repair guide. Eaton, R.A., et al, [1984, 12p.] TD 84-61	SR 86-14 Detection of sound by persons buried under snow avalanche.	Lobacz, E.F., et al, ¿1978, p.474-489; MP 1008 Prost action in New Jersey highways. Berg, R.L., et al,
Long-term effects of off-road vehicle traffic on tundra terrain. Abele, G., et al, [1984, p.283-294] MP 1820	Johnson, J.B., [1984, p.42-47] MP 1920 Detection of buried utilities. Bigl, S.R., et al, [1984, 36p.] CR \$4-31	[1978, 80p.] SR 78-69 Study of water drainage from columns of snow. Denoth, A.,
Dems Lee breakup on the Chena River 1975 and 1976. McPadden,	Mine detection in cold regions using short-pulse radar. Ar-	et al, [1979, 19p.] CR 79-01 Drainage network of a subarctic watershed. Bredthauer,
T., et al. (1977, 44p.) CR 77-14 Working group on ice forces on structures. Carstens, T., ed.	cone, S.A., 1195, 16p.; SR 85-23 Construction engineering community: materials and diagnostics. 11956, 54p.; SR 85-01	S.R., et al, [1979, 9p.] Drainage network analysis of a subarctic watershed. Bred-
[1980, 146p.] SR 88-26 Limnology of Lake Koocanusa, MT, the 1967-1972 study.	Detenation waves Review of antitank obstacles for winter use. Richmond,	thauer, S.R., et al., [1979, p.349-359] MP 1274 Hydraulic characteristics of the Deer Creek Lake land treat-
Bonde, T.J.H., et al, [1982, 184p.] SR 82-21 Tailwater flow conditions. Ferrick, M.G., et al, [1983,	P.W., (1984, 12p.) CR 84-25 Deutstriam exide ice	ment site during wastewater application. Abele, G., et al. [1981, 37p.] CR 81-07 Roof moisture surveys. Tobiasson, W., [1982, p.163-166]
31p. ₁ CR 83-67 Modeling rapidly varied flow in tailwaters. Ferrick, M.G., et	Mass transfer along ice surfaces. Tobin, T.M., et al., (1977, p.34-37) MP 1691	MP 1508 Potholes: the problem and solutions. Eaton, R.A., [1982,
al, [1984, p.271-289] MP 1711 Design and performance of water-retaining embankments in	Dislectric properties Electrical resistivity profile of permafrost. Hockstra, P.,	p.160-162) MP 1504 Hydrology and climatology of a drainage basin near Pair-
permafrost. Sayles, F.H., [1984, p.31-42] MP 1850 Survey of ice problem areas in navigable waterways. Zuckt.	[1974, p.28-34] MP 1945 Excavating rock, ice, and frozen ground by electromagnetic	banka, Alaska. Haugen, R.K., et al, [1982, 34p.] CR 82-26
J., et al., [1985, 32p.] SR 85-02 Deta proceeding	radiation. Hoekstra, P., [1976, 17p.] CR 76-36 Internal properties of the ice sheet at Cape Folger by radio	Ice-blocked drainage: problems and processes. Carey, K.L., [1983, 9p.] Carey, K.L., TD 83-62
Remote sensing plan for the AIDJEX main experiment. Weeks, W.F., et al., [1975, p.21-48] MP 862 Analysis of snow water equivalent using LANDSAT data.	echo sounding. Keliher, T.E., et al., r1978, 12p.; CR 78-94	Solving problems of ice-blocked drainage. Carey, K.L., [1984, 9p.] TD 84-62
Merry, C.J., et al., [1977, 16 leaves] MP 1113 Automatic data collection equipment for oceanographic ap-	Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-06	Brect of open water disposal of dredged sediments. Blom,
plication. Dean, A.M., Jr., [1978, p.1111-1121]	Anisotropic properties of sea ice. Kovaca, A., et al., (1979, p.5749-5759) MIP 1258	B.E., et al, [1976, 183p.] MP 967 Consolidating dredged material by freezing and thawing.
Multivariable regression algorithm. Blaisdeil, G.L., et al, [1983, 41p.] SR 83-32	Liquid distribution and the dielectric constant of wet snow. Colbeck, S.C., [1980, p.21-39] MP 1349 VHF electrical properties of frozen ground near Point Barrow,	Char. berlain, E.J., [1977, 94p.] MP 978 Densatication by freezing and thawing of fine material dredged from waterways. Chamberlain, E.J., et al., [1978,
User's guide for the BIBSORT program for the IBM-PC personal computer. Kyriakakis, T., et al, [1985, 61].	Alaska, Arcone, S.A., et al, [1981, 18p.] CR 91-13 Ground dielectric properties. Arcone, S.A., et al, [1982,	p.622-628; MP 1163 Subsea treaching in the Arctic. Mellor, M., [1981, 31p.]
Data transmission	11p.; CR 82-66 Laboratory measurements of soil electric properties between	CR 81-17 Restoration of scidic dredge soils with sewage sludge and
Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al, [1975, p.200-21], MP 1955	0.1 and 5 GHz. Delaney, A.J., et al, [1982, 12p.] CR 82-10	lime. Palazzo, A.J., 1983, 11p.; CR 83-28 Impact of dredging on water quality at Kewaunee Harbor,
Landsat data collection platform, south central Alaska. Haugen, R.K., et al., 1979, 17 refs.; SR 79-02	Dielectric properties of thawed active layers. Arcone, S.A., et al, [1982, p.618-626] MP 1547	Wisconsin. Iskandar, I.K., et al, (1984, 16p.) CR 84-21
Communication in the work place: an ecological perspective. Ledbetter, C.B., [1979, 19p.] SR 79-03	Effect of X-ray irradiation on internal friction and dielectric relaxation of ice. Itagaki, K., et al, [1983, p.4314-4317]	Use of remote sensing for the U.S. Army Corps of Engineers dredging program. McKim, H.L., et al. [1985, p. 114]
Decomposition	MP 1679 Dielectric measurements of frozen silt using time domain re- flectometry. Delaney, A.J., et al, (1984, p.39-46)	1150; MP 1890 Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al., [1985, 42p.]
Proceedings 1972 Tundra Biome symposium. [1972, 211p.] MP 1374 Defects	MP 1775 Pield dielectric measurements of frozen silt using VHF pulses.	SR 85-20
Guide to managing the pothole problem on roads. Eaton, R.A., et al, [1981, 24p.] SR 81-21	Arcone, S.A., et al., [1984, p.29-37] MP 1774 Coaxial waveguide reflectometry for frozen ground and ice.	Results of the US contribution to the Joint US/USSR Bering Sea Experiment. Campbell, W.J., et al, [1974, 197p.]
Deformation Technique for measuring radial deformation during repeated	Delaney, A.J., et al., [1984, p.428-431] MIP 2048 Analysis of wide-angle reflection and refraction measure-	MP 1632 Meso-scale strain measurements on the Beaufourt sea pack
load triaxial testing. Cole, D.M., [1978, p.426-429] MP 1157	ments. Morey, R.M., et al, [1985, p.53-60] MP 1953	ice (AIDJEX 1971). Hibler, W.D., III, et al., 1974, p.119-138; MP 1035
Pavement deflection after freezing and thawing. Chamber- lain, E.J., [1981, 10p.] CR 81-15 Blisters in built-up roofs due to cold weather. Korbonen, C.,	Dielectric studies of permafrost. Arcone, S.A., et al., [1985, p.3-5] MP 1951	Ice dynamics, Canadian Archipelago and adjacent Arctic ba- sin. Ramseier, R.O., et al, (1975, p.853-877) MP 1585
et al. [1983, 12p.] SR 83-21	Diffusion Transport equation over long times and large spaces. O'Neill, K., r1981, p.1665-1675; MP 1497	Remote measurement of sea ice drift. Hibler, W.D., III, et
Modifications of permafrost, Rest Oumalik, Aleska. Lawson, D.E., [1982, 33p.]	O'Neill, K., [1981, p.1665-1675] MF 1497 Wetting fronts in porous media. Nakano, Y., [1983, p.71-78] MF 1720	al, (1975, p.541-554) Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al, (1976, p.115-135) MP 1089
Degree days Unified degree-day method for river ice cover thickness simu-	Soil-water diffusivity of unsaturated frozen soils at subzero temperatures. Nakano, Y., et al., [1983, p.889-893]	Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery. Hibler, W.D.,
lation. Shen, H.T., et al, (1985, p.54-62) MP 2065 Delaware Bay	MP 1664 Diffusivity of horizontal water flow through porous media.	III, et al, [1976, p.595-609] MP 866 Sea ice conditions in the Arctic. Weeks, W.F., [1976,
Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, 1985, p.1123-	Nakano, Y., [1985, p.26-31] MP 1891 Discontinuous permafrost	p.173-205 ₁ MP 910 Sessonal variations in apparent sea ice viscosity on the geo-
1129; MP 1909 Density (mass/volume)	Geophysical methods for hydrological investigations in per- mafrost regions. Hockstra, P., [1976, p.75-90]	physical scale. Hibler, W.D., III, et al., [1977, p.87-90] MP 900
Temperature effects in compacting an asphalt concrete over- lay. Eston, R.A., et al. [978, p.146-158] MP 1683	Climatic and dendroclimatic indices in the discontinuous per-	Dynamics of near-shore ice. Kovacs, A., et al, 1977, p. 151-163; MP 1673
Soil infiltration on land treatment sites. Abele, G., et al. [1980, 41p.] SR 69-36	mafrost zone of the Central Alaskan Uplands. Haugen, R.K., et al, [1978, p.392-398] MP 1099	Ice arching and the drift of pack ice through restricted chan- nels. Sodhi, D.S., [1977, 11p.] CR 77-18
Arctic Ocean temperature, salinity and density, March-May 1979. McPhee, M.G., (1981, 20p.) SR 81-95 Laboratory and field use of soil tensiometers above and below	Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Bibliography of permafrost soils and vegetation in the USSR.	Nearshore ice motion near Prudhoe Bay, Alaska. Tucker, W.B., et al, [1977, p.23-31] MP 1162 Finite element formulation of a sea ice drift model. Sodhi,

Drift (cent.) Dynamics of near-shore ice. Kovacs, A., et al, [1977,	Engineering properties of submarine permafrost near Prudhoe Bay. Chamberlain, E.J., et al, [1978, p.629-635]	Critical velocities of a floating ice plate subjected to in-plane forces and a moving load. Kerr, A.D., [1979, 12p.]
p.503-510 ₁ MP 1200	MP 1104 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska.	CR 79-19 Volumetric constitutive law for snow under strain. Brown.
Ice arching and the drift of pack ice through channels. Sod- hi, D.S., et al, [1978, p.415-432] MP 1138	Page, F.W., et al. [1978, 70p.] SR 78-14	R.L., [1979, 13p.] CR 79-20
Dynamics of near-shore ice. Kovacs, A., et al, [1978, p.11- 22] MP 1205	Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska. Sellmann, P.V., et al, [1979, p.1481-1493]	Cyclic loading and fatigue in ice. Mellor, M., et al, [1981, p.41-53] MP 1371
Measurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971). Hibler, W.D., III, et al, [1978, p.148-	MP 1211 Stratified debris in Antarctic ice cores. Gow, A.J., et al,	On the buckling force of floating ice plates. Kerr, A.D., [1981, 7p.] CR 81-09
172 ₁ MP 1179	[1979, p.185-192] MP 1272 20-yr cycle in Greenland ice core records. Hibler, W.D., III,	Dynamic ice-structure interaction analysis for narrow vertical structures. Eranti, E., et al, [1981, p.472-479]
Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., 1979.	et al, [1979, p.481-483] MP 1245	MP 1456
p.388-400 ₁ MP 1198 Drifting buoy measurements on Weddell Sea pack ice. Ack-	Antifreeze-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., [1979, 12p.] CR 79-24	Acoustic emissions from polycrystalline ice. St. Lawrence, W.F., et al, [1982, p.183-199] MIP 1524
ley, S.F., (1979, p.106-108) MP 1339 Oceanic boundary-layer features and oscillation at drift sta-	Ultrasonic tests of Byrd Station ice cores. Gow, A.J., et al. [1979, p.147-153] MP 1282	Dynamic ice-structure interaction during continuous crushing. Maattanen, M., (1983, 48p.) CR 83-65
tions. McPhee, M.G., [1980, p.870-884] MP 1369	Margin of the Greenland ice sheet at Isua. Colbeck, S.C., et	Dynamic buckling of floating ice sheets. Sodhi, D.S., [1983, p.822-833] MP 1687
Sea ice growth, drift, and decay. Hibler, W.D., III, [1980, p.141-209] MP 1298	al, (1979, p.155-165) MP 1281 Features of permafrost beneath the Beaufort Sea. Sellmann,	Thermal patterns in ice under dynamic loading. Fish, A.M.,
Continuum sea ice model for a global climate model. Ling. C.H., et al, [1980, p.187-196] MP 1622	P.V., et al. [1980, p.103-110] MP 1344 Time-priority studies of deep ice cores. Gow, A.J., [1980,	et al, [1983, p.240-243] MP 1742 Dependence of crushing specific energy on the aspect ratio
Nonsteady ice drift in the Strait of Belle Isle. Sodhi, D.S.,	p. 91-102 ₁ MP 1308 Characteristics of permafrost beneath the Beaufort Sea. Sell-	and the structure velocity. Sodhi, D.S., et al, 1984, p.363-374; MP 1768
et al, [1980, p.177-186] MP 1364 Modeling a variable thickness sea ice cover. Hibler, W.D.,	mann, P.V., et al, (1981, p.125-157) MP 1428	Determining the characteristic length of floating ice sheets by moving loads. Sodhi, D.S., et al, [1985, p.155-159]
III, ₍₁ 980, p.1943-1973 ₁ MP 1424 Sea ice studies in the Weddell Sea aboard USCGC Polar Sea.	Drilling Subsurface explorations in permafrost areas. Cass, J.R., Jr.,	MI ⁵ 1855
Ackley, S.F., et al, [1980, p.84-96] MP 1431	(1959, p.31-41) MP 885 General considerations for drill system design. Mellor, M.,	Earth dams Construction and performance of the Hess creek earth fill
Sea-ice atmosphere interactions in the Weddell Sea using drifting buoys. Ackley, S.F., [1981, p.177-191]	et al, [1976, p.77-111] MP 856	dam, Livengood, Alaska. Simoni, O.W., [1973, p.23-34] MP 859
MP 1427 Dynamics of near-shore ice. Kovacs, A., et al, [1981,	USA CRREL shallow drill. Rand, J.H., [1976, p.133-137] MP 673	Slumping failure of an Alaskan earth dam. Collins, C.M., et al, 1977, 21p.; SR 77-21
p.125-135 ₁ MP 1599 Preliminary results of ice modeling in the East Greenland	Dynamics and energetics of parallel motion tools for cutting and boring. Mellor, M., [1977, 85p.] CR 77-67	Remote sensing for earth dam site selection and construction
area. Tucker, W.B., et al, [1981, p.867-878]	Ross Ice Shelf Project drilling, October-December 1976.	materials. Merry, C.J., et al, [1980, p.158-170] MP 1316
MP 1458 Application of a numerical sea ice model to the East Green-	Rand, J.H., [1977, p.150-152] MP 1061 Large mobile drilling rigs used along the Alaska pipeline.	Embankment dams on permafrost in the USSR. Johnson, T.C., et al, [1980, 59p.] SR 38-41
land area. Tucker, W.B., [1981, 109p.] MP 1535 Sea ice drag laws and boundary layer during rapid melting.	Sellmann, P.V., et al, (1978, 23p.) SR 78-04 Ross Ice Shelf Project environmental impact statement July,	Rorth fills
McPhee, M.G., [1982, 17p.] CR 82-04	1974. Parker, B.C., et al., [1978, p.7-36] MP 1075	Construction and performance of the Heas creek earth fill dam, Livengood, Alaska. Simoni, O.W., [1973, p.23-34]
Application of a numerical sea ice model to the Bast Green- iand area. Tucker, W.B., [1982, 40p.] CR 82-16	Engineering properties of submarine permafrost near Prudhoe Bay. Chamberlain, E.J., et al., (1978, p.629-635)	MP 859 Rarth movement
Offshore mechanics and Arctic engineering, symposium, 1983, [1983, 813p.] MP 1581	MP 1104 Core drilling through Ross Ice Shelf. Zotikov, I.A., et al,	Analysis of explosively generated ground motions using Fourier techniques. Blouin, S.E., et al, [1976, 86p.]
Numerical simulation of the Weddell Sea pack ice. Hibler, W.D., III, et al, [1983, p.2873-2887] MP 1592	(1979, p.63-64) MP 1337 Danish deep drill; progress report: February-March 1979.	CR 76-28
Modeling of ice discharge in river models. Calkins, D.J.,	Rand, J.H., [1980, 37p.] SR 80-03	Earthquakes Hydraulic transients: a seismic source in volcanoes and gla-
[1983, p.285-290] MP 2081 Offshore petroleum production in ice-covered waters. Tuck-	Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.]	ciers. St. Lawrence, W.F., et al, (1979, p.654-656) MP 1181
er, W.B., [1983, p.207-215] MP 2086 Mechanism for floe clustering in the marginal ice zone. Lep-	SR 86-12 Mechanics of cutting and boring in permafrost. Mellor, M.,	Alaska Good Friday earthquake of 1964. Swinzow, G.K., [1982, 26p.] CR 82-01
paranta, M., et al, [1984, p.73-76] MP 1785	[1980, 82p.] CR \$0-21	Fluid dynamic analysis of volcanic tremor. Ferrick, M.G., et
East Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al, [1984, p.9-14] MP 1779	South Pole ice core drilling, 1981-1982. Kuivinen, K.C., et al., [1982, p.89-91] MP 1621	al, [1982, 12p.] CR 82-32 Source mechanism of volcanic tremor. Ferrick, M.G., et al,
Sea ice data buoys in the Weddell Sea. Ackley, S.F., et al, [1984, 18p.] CR 84-11	Calculating borehole geometry. Jezek, K.C., et al, 1984, 18p.; SR 84-15	[1982, p.8675-8683] MIP 1576 Earthwork
Mechanical properties of sea ice: a status report. Weeks,	Arctic ice and drilling structures. Sodhi, D.S., [1985, p.63-69] MP 2119	Regionalized feasibility study of cold weather earthwork. Roberts, W.S., [1976, 190p.] SR 76-62
W.F., et al, [1984, p.135-198] MP 1808 Ice dynamics. Hibler, W.D., III, [1984, 52p.]	Drilling fluids	Winter earthwork construction in Upper Michigan. Hass,
M 84-03 Model simulation of 20 years of northern hemisphere sea-ice	Sorption of military explosive contaminants on bentonite drilling muds. Leggett, D.C., [1985, 33p.] CR 85-18	W.M., et al. [1977, 59p.] SR 77-46 Some aspects of Soviet trenching machines. Mellor, M.,
fluctuations. Walsh, J.E., et al, [1984, p.170-176, MP 1767	Drills Stake driving tools: a preliminary survey. Kovaca, A., et al,	[1980, 13p.] SR \$8-87 Construction of an embankment with frozen soil. Botz, J.J.,
Sea ice penetration in the Arctic Ocean. Weeks, W.F.,	[1977, 43p.] SR 77-13	et al, [1980, 105p.] SR 80-21
(1984, p.37-65) MP 1993 Arctic sea ice and naval operations. Hibler, W.D., III, et al,	Transverse rotation machines for cutting and boring in perma- frost. Mellor, M., (1977, 36p.) CR 77-19	Excavation of frozen materials. Moore, H.E., et al. [1980, p.323-345] MP 1340
(1984, p.67-91) MP 1994 Numerical modeling of sea ice dynamics and ice thickness.	Mechanics of cutting and boring in permafrost. Mellor, M., [1981, 38p.] CR 81-26	Ecological baseline on the Alaskan haul road. Brown, J., ed,
Hibler, W.D., III, [1985, 50p.] CR 85-05 Numerical simulation of Northern Hemisphere sea ice varia-	Prototype drill for core sampling fine-grained perennially frozen ground. Brockett, B.E., et al, (1985, 29p.)	[1978, 131p.] SR 78-13 International Workshop on the Seasonal Sea Ice Zone, Mon-
bility, 1951-1980. Walah, J.E., et al, [1985, p.4847-	CR 85-01	terey, California, Feb. 26-Mar.1, 1979. Andersen, B.G.,
4865 ₁ MP 1882 Drift stations	Drops (liquids) Numerical simulation of atmospheric ice accretion. Ackley,	Economic analysis
Some results from a linear-viscous model of the Arctic ice cover. Hibler, W.D., III, et al, [1979, p.293-304]	S.F., et al, [1979, p.44-52] MP 1235 Heat and mass transfer from freely falling drops at low tem-	Regionalized feasibility study of cold weather earthwork. Roberts, W.S., {1976, 190p.} SR 76-02
MP 1241 Arctic Ocean temperature, salinity and density, March-May	peratures. Zarling, J.P., [1980, 14p.] CR 80-18 Condensate profiles over Arctic leads. Andreas, E.L., et al,	Economics Toming insperses Longdole H.K. et al. 1974 p. 2.
1979. McPhee, M.G., [1981, 20p.] SR 81-05	[1981, p.437-460] MIP 1479	Towing icebergs. Lonsdale, H.K., et al, [1974, p.2] MP 1020
Air-ice-ocean interaction experiments in Arctic marginal ice zones. [1984, 56p.] SR 84-28	Drying Can wet roof insulation be dried out. Tobiasson, W., et al,	Some economic benefits of ice booms. Perham, R.E., [1977, p.570-591] MP 959
Mesoscale air-ice-ocean interaction experiments. Johannessen, O.M., ed, [1984, 176p.] SR 84-29	[1983, p.626-639] MP 1509	Ecosystems Tundra biome program. Brown, J., (1970, p.1278)
Drill core analysis	Changes in the composition of atmospheric precipitation.	MP 881
Byrd Land quaternary volcanism. LeMasurier, W.E., [1972, p.139-141] MP 994	Cragin, J.H., et al, [1977, p.617-631] MP 1079 Chemical composition of haul road dust and vegetation. Is-	Tundra biome applies new look to ecological problems in Alaska. Brown, J., {1970, p.9} MP 880
Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al, [1975, p.5101-5108] MP 847	kandar, I.K., et al, (1978, p.110-111) MP 1116 Road dust along the Haul Road, Alaska. Everett, K.R.,	Word model of the Barrow ecosystem. Brown, J., et al., (1970, p.41-43) MP 943
Internal structure and crystal fabrics of the West Antarctic ice sheet. Gow, A.J., et al, [1976, 25p.] CR 76-35	(1980, p.101-128) MP 1352 Dust control	Synthesis and modeling of the Barrow, Alaska, ecosystem. Coulombe, H.N., et al, [1970, p.44-49] MP 944
Delineation and engineering characteristics of permafrost	Sublimation and its control in the CRREL permafrost tunnel.	Bibliography of the Barrow, Alaska, IBP ecosystem model.
beneath the Beaufort Sea. Selimann, P.V., et al, [1976, p.53-60] MP 919	Johansen, N.I., (1981, 12p.) SR 81-06 Dynamic loads	Brown, I., [1970, p.65-71] MP 946 Influence of grazing on Arctic tundra ecosystems. Betzli,
Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977,	Repetitive loading tests on membrane enveloped road sec- tions during freeze thaw. Smith, N., et al, [1977, p.171-	G.O., et al. (1976, p.153-160) MP 970 Geobotanical atlas of the Prudhoe Bay region, Alaska.
p.432-440; MP 1077 1977 CRREL-USGS permafrost program Beaufort Sea, Alas-	197] MP 962 Technique for measuring radial deformation during repeated	Walker, D.A., et al, (1980, 69p.) CR 80-14 Arctic ecosystem: the coastal tundra at Barrow, Alaska.
ka, operational report. Sellmann, P.V., et al., [1977, 19p.] SR 77-41	load triaxial testing. Cole, D.M., [1978, p.426-429]	Brown, J., ed, [1980, 571p.] MP 1355
Delineation and engineering characteristics of permafrost	MP 1157 Procze thaw loading tests on membrane enveloped road sec-	Coastal tundra at Barrow. Brown, J., et al. (1980, p.1-29) MP 1356
beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.518-521; MP 1201	tions. Smith, N., et al, [1978, p.1277-1288] MP 1158	Tundra and analogous soils. Everett, K.R., et al, (1981, p.139-179) MP 1405

Introduction to abiotic components in tundra. Brown, J., [1981, p.79] MP 1432	Electrical ground impedance. Arcone, S.A., et al. [1978, 92p.]	Electron microscopy Aerosols in Greenland snow and ice. Kumai, M., (1977,
Point Barrow, Alaska, USA. Brown, J., (1981, p.775-776)	Geophysics in the study of permafrost. Scott, W.J., et al,	p.341-350 _j MP 1721
MP 1434 U.S. tundra biome publication list. Brown, J., et al, [1983,	(1979, p.93-115) MP 1266 Bibliography on techniques of water detection in cold regions.	Elemental analyses of ice crystal nuclei and aerosols Kumai, M., [1977, Sp.] MP 1191
29p. ₁ SR 83-29	Smith, D.W., comp, [1979, 75p.] SR 79-10	Antarctic soil studies using a scanning electron microscope
Electic properties Flexible pavement resilient surface deformations. Smith, N.,	Electrical resistivity of frozen ground. Arcone, S.A., 1979, p.32-37, MP 1623	Kumai, M., et al, (1978, p.106-112) MP 1300 Measurement and identification of aerosols collected near
et al, (1975, 13 leaves) MP 1264	Determination of frost penetration by soil resistivity measure-	Barrow, Alaska. Kumai, M., [1978, 6p.] CR 78-20
Resiliency of subgrade soils during freezing and thawing. Johnson, T.C., et al., [1978, 59p.] CR 78-23	ments. Atkins, R.T., [1979, 24p.] SR 79-23 Break-up of the Yukon River at the Haul Road Bridge: 1979.	Electron microscope investigations of frozen and unfrozen bentonite. Kumai, M., {1979, 14p.} CR 79-20
Photoelestic instrumentation—principles and techniques. Roberts, A., et al, [1979, 153p.] SR 79-13	Stephena, C.A., et al, [1979, 22p. + Figs.] NIP 1315 Measurements of ground resistivity. Arcone, S.A., [1982,	Ice crystal formation and supercooled fog dissipation
Bending and buckling of a wedge on an elastic foundation.	p.92-110 ₁ MP 1513	Kumai, M., (1982, p.579-587) MP 1539 Electronic equipment
Nevel, D.E., [1980, p.278-288] MP 1363 Effect of freezing and thawing on resilient modulus of granu-	Improving electric grounding in frozen materials. Delaney, A.J., et al, [1982, 12p.] SE 82-13	Using electronic measurement equipment in winter. Atkins
lar soils. Cole, D.M., et al, [1981, p.19-26]	Radar wave speeds in polar glaciers. Jezek, K.C., et al,	R.T., (1981, 7p.) TD 81-01 Effects of conductivity on high-resolution impulse rada:
MP 1484 Resistance of elastic rock to the propagation of tensile cracks.	[1983, p.199-208] MIP 2057 Conductive backfill for improving electrical grounding in	sounding. Morey, R.M., et al, [1982, 12p.] CR 82-42
Peck, L., et al, [1985, p.7827-7836] MP 2052	frozen soils. Sellmann, P.V., et al, (1984, 19p.)	Emberskenets
Elastic waves Observations of volcanic tremor at Mount St. Helens volcano.	Electricity	Thermoinsulating media within embankments on perennially frozen soil. Berg, R.L., (1976, 161p.) SR 76-63
Fehler, M., [1984, p.3476-3484] MP 1770 Electric charge	Utility distribution systems in Sweden, Pinland, Norway and England. Asmot, H.W.C., et al. [1976, 121p.]	Light-colored surfaces reduce thaw penetration in permafrost
X-ray measurement of charge density in ice. Itagaki, K.,	SR 76-16	Berg, R.L., et al. [1977, p.86-99] MIP 954 Construction of an embankment with frozen soil. Botz, J.J.
[1978, 12p.] CR 79-25 Possibility of anomalous relaxation due to the charged dislo-	Electromagnetic properties Excavating rock, ice, and frozen ground by electromagnetic	et al, [1980, 105p.] SR 98-21
cation process. Itagaki, K., (1983, p.4261-4264)	radiation. Hockstra, P., (1976, 17p.) CR 76-36	Embankment dams on permafrost in the USSR. Johnson. T.C., et al, [1980, 59p.] SR 88-41
MP 1669 Electric equipment	Radar anisotropy of sea ice. Kovaca, A., et al, 1978, p.6037-6046; MP 1139	Comparison of two-dimensional domain and boundary inte- gral geothermal models with embankment freeze-thaw field
Simplified method for monitoring soil moisture. Walsh, J.B.,	Anisotropic properties of sea ice in the 50-150 MHz range.	data. Hromadka, T.V., II, et al, [1983, p.509-513]
et al, [1978, p.40-44] NLP 1194 Mapping resistive seabed features using DC methods. Sell-	Kovaca, A., et al, [1979, p.324-353] MP 1620 Modeling of anisotropic electromagnetic reflection from sea	MP 1659 Design and performance of water-retaining embankments in
mann, P.V., et al, [1985, p.136-147] MP 1918	ice. Golden, K.M., et al, [1980, p.247-294] MP 1325	permafrost. Sayles, F.H., (1984, p.31-42) MIP 1850
Electric fields Interaction of a surface wave with a dielectric slab discon-	Physical properties of sea ice and under-ice current orienta-	Engine starters in winter. Coutts, H.J., [1981, 37p.]
tinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-66 VLF airborne resistivity survey in Maine. Arcone, S.A.,	tion. Kovacs, A., et al. (1980, p.109-153) MP 1323 Review of techniques for measuring soil moisture in situ.	SR \$1-32
[1978, p.1399-1417] MIP 1166	McKim, H.L., et al, [1980, 17p.] SR 98-31	See ice engineering. Assur, A., (1976, p.231-234)
Distortion of model subsurface radar pulses in complex dis- lectrics. Arcone, S.A., [1981, p.855-864] MIP 1472	Sea ice anisotropy, electromagnetic properties and strength. Kovacs, A., et al, (1980, 18p.) CR 86-20	MP 900
Electric power	Modeling of anisotropic electromagnetic reflection from sea	Defineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, [1977,
Losses from the Fort Wainwright heat distribution system. Phetteplace, G., et al, [1981, 29p.] SR 81-14	ice. Golden, K.M., et al., [1980, 15p.] CR 88-23 Modeling of anisotropic electromagnetic reflections from sea	p.385-395 ₁ MP 1674 Proceedings of the Second International Symposium on Cold
Ice growth and circulation in Kachemak Bay, Alaska. Daly,	ice. Golden, K.M., et al, [1981, p.8107-8116]	Regions Engineering. Burdick, J., ed, (1977, 597p.)
S.F., [1982, p.(C)1-(C)9] MP 1501 Electrical grounding	SNOW-ONE-A; Data report. Aitken, G.W., ed, 1982,	MP 952 Engineering properties of snow. Mellor, M., (1977, p.15-
Improving electric grounding in frozen materials. Delaney,	64 ip. 1 SR 82-68 Geometry and permittivity of anow. Colbeck, S.C., [1982,	66 ₁ MP 1019
A.J., et al, [1982, 12p.] SR 82-13 Observations during BRIMFROST '83. Bouzoun, J.R., et al,	p.113-131 ₁ MP 1965	Engineering properties of sea ice. Schwarz, J., et al, ¿1977, p.499-531; MP 1068
(1984, 36p.) SR 84-10 Conductive backfill for improving electrical grounding in	Performance and optical signature of an AN/VVS-1 laser rangefinder in falling anow: Preliminary test results. La-	Undersea pipelines and cables in polar waters. Mellor, M. (1978, 34p.)
frozen soils. Seilmann, P.V., et al, [1984, 19p.]	combe, J., [1983, p.253-266] MIP 1759	Ice engineering. O'Steen, D.A., (1980, p.41-47)
SR 84-17 Electrical measurement	Progress in methods of measuring the free water content of snow. Pisk, D.J., {1983, p.48-51} MP 1649	Problems of the seasonal sea ice zone. Weeks, W.F., (1980,
Technique for measuring radial deformation during repeated	Characterization of snow for evaluation of its effect on elec- tromagnetic wave propagation. Berger, R.H., [1983,	p.1-35 ₁ MCP 1293
load triaxial testing. Cole, D.M., [1978, p.426-429] MP 1157	p.35-42 ₁ MP 1648	Conference on Computer and Physical Modeling in Hydrau- lic Engineering, 1980. Ashton, G.D., ed, [1980, 492p.] MP 1321
Catalog of smoke/obscurant characterization instruments. O'Brien, H.W., et al, [1984, p.77-82] MP 1865	Electromagnetic properties of sea ice. Morey, R.M., et al. [1984, 32p.] CR 84-92	
Electrical properties	Electromagnetic properties of sea ice. Morey, R.M., et al,	Haul Road performance and associated investigations in Alse- ka. Berg. R.L., 1980, p.53-100; MP 1351
Shallow electromagnetic geophysical investigations of perma- frost. Arcone, S.A., et al., [1978, p.501-507]	[1984, p.53-75] MP 1776 Electromagnetic pulse propagation in dielectric slabs. Ar-	Characteristics of permafrost beneath the Beaufort Sea. Sell- mann, P.V., et al, [1981, p.125-157] MP 1426
MP 1101	cone, S.Ä., 1984, p.1763-1773, MP 1991 Authors' response to discussion on: Electromagnetic proper-	Engineer's pothole repair guide. Baton, R.A., et al, [1984,
Electrical properties of frozen ground, Point Barrow, Alaska. Arcone, S.A., et al. [1982, p.485-492] MP 1572	ties of sea ice. Morey, R.M., et al, [1984, p.95-97]	12p.; TD 84-61 Computational mechanics in arctic engineering. Sodhi, D.S.
Electrical prespecting Shallow electromagnetic econhysical investigations of perma-	MP 1822 Discussion: Electromagnetic properties of sea ice by R.M.	(1984, p.351-374) MP 2072
frost. Arcone, S.A., et al, (1978, p.501-507)	Morey, A. Kovacs and G.F.N. Cox. Arcone, S.A., (1984, p.93-94;	Cold climate utilities manual. Smith, D.W., ed, [1986, var.p.] MP 2135
MP 1101 Electrical resistivity	Performance of microprocessor-controlled snow crystal repli-	Engineering goology
Conductivity and surface impedance of sea ice. McNeill, D.,	cator. Koh, G., [1984, p.107-111] MP 1866 Electromagnetic properties of multi-year sea ice. Morey,	Delineation and engineering characteristics of permafros beneath the Beaufort Sea. Sellmann, P.V., et al., (1976,
et al, [1971, 19p. plus diagrams] MP 1071 Electrical resistivity profile of permafrost. Hoekstra, P.,	R.M., et al, [1985, p.151-167] MP 1962	p.53-60 ₁ MP 919
(1974, p.28-34) MP 1045 Airborne E-phase resistivity surveys of permafrost. Sell-	Electromagnetic measurements of multi-year sea ice using impulse radar. Kovacs, A., et al, [1985, 26p.]	Distribution and properties of subsea permafrost of the Beau- fort Sea. Selimann, P.V., et al., [1979, p.93-115, MP 1287
mann, P.V., et al, [1974, p.67-71] MP 1046	CR 85-13	Cold Regions Science and Technology Bibliography. Cum
Electrical ground impedance measurements in Alaskan per- mafrost regions. Hoekstra, P., (1975, 60p.)	Electromagnetic measurements of sea ice. Kovacs, A., et al, [1986, p.67-93] MP 2020	mings, N.H., (1981, p.73-75) MIP 1372
MP 1049	Electromagnetic prospecting Geophysical methods for hydrological investigations in per-	Engines Construction equipment problems and procedures: Alaska
Bedrock geology survey in northern Maine. Sellmann, P.V., et al, [1976, 19p.] CR 76-37	mafrost regions. Hoekstra, P., 1976, p.75-90	pipeline project. Hanamoto, B., [1978, 14p.]
Selected examples of radiohm resistivity surveys for geotech-	MP 932 Evaluation of electrical equipment for measuring permafrost	Low temperature automotive emissions. Coutts, H.J.
nical exploration. Hoekstra, P., et al, [1977, 16p.]	distribution. Sellmann, P.V., et al. [1977, p.39-42]	[1983, 2 vols.] MP 1703 Enthalpy
Structural growth of lake ice. Gow, A.J., et al, [1977, 24p.] CR 77-01	Geophysics in the study of permafrost. Scott, W.J., et al,	Introduction to the basic thermodynamics of cold capillary
Computer program for determining electrical resistance in	[1979, p.93-115] MP 1266 Electromagnetic survey in permafrost. Sellmann, P.V., et al,	systems. Colbeck, S.C., [1981, 9p.; SR 81-86 Solution of phase change problems. O'Neill, K., [1983,
nonhomogeneous ground. Arcone, S.A., [1977, 16p.] CR 77-02	[1979, 7p.] SR 79-14	p.134-146j MP 1894
Numerical studies for an airborne VLF resistivity survey. Arcone, S.A., [1977, 10p.] CR 77-65	Electrical resistivity of frozen ground. Arcone, S.A., 1979, p.32-37, MP 1623	Environment simulation Numerical simulation of atmospheric ice accretion. Ackley
Evaluation of electrical equipment for measuring permafrost	Electromagnetic surveys of permafrost. Arcone, S.A., et al,	S.F., et al., (1979, p.44-52) MP 1239
distribution. Sellmann, P.V., et al, [1977, p.39-42] MP 925	[1979, 24p.] CR 79-23 Biectromagnetic subsurface measurements. Dean, A.M., Jr.,	Computer simulation of urban snow removal. Tucker, W.B. et al, [1979, p.293-302] MP 1230
Investigation of an airborne resistivity survey conducted at very low frequency. Arcone, S.A., 1977, 48p.;	[1981, 19p.] SR 81-23 Measurements of ground resistivity. Arcone, S.A., [1982,	Ocean circulation: its effect on seasonal sea-ice simulations Hibler, W.D., III, et al, [1984, p.489-492] MP 1784
CR 77-20	p.92-110 ₁ MP 1513	Numerical simulation of Northern Hemisphere sea ice varia
VLF airborne resistivity survey in Maine. Arcone, S.A., (1978, p.1399-1417) MP 1166	Snow and fog particle size measurements. Berger, R.H., r1982, p.47-58; MP 1982	bility, 1951-1980. Walsh, J.B., et al., (1985, p.4847-4865) MP 1883

ENVIRONMENTAL IMPACT Symposium on fire in the northern environment. Slaughter,	Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Anderson, D.M., et al, [1973, 5p.]	Pavement recycling using a heavy bulldozer mounted pulver- izer. Eaton, R.A., et al, [1977, 12p. + appenda.]
C.W., ed, [1971, 275p.] MP 878	MP 1611	SR 77-30
Divirgumental impact Boological effects of oil spills and scopages in cold-dominated	Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al, (1973, 6p.) MP 1031	Design for cutting machines in permafrost. Mellor, M., [1978, 24p.] CR 78-11
environments. McCown, B.H., et al, (1971, p.61-65) MF 905	High-latitude basins as settings for circumpolar environmen- tal studies. Slaughter, C.W., et al, (1975, p.IV/57-	Underses pipelines and cables in polar waters. Mellor, M., [1978, 34p.] CR 78-22
Thermal energy and the environment. Crosby, R.L., et al,	IV/68 ₁ MIP 917	Mechanics of cutting and boring in permafrost. Mellor, M.,
(1975, 3p. + 2p. figs.) MP 1480	Applications of remote sensing in New England. McKim, H.L., et al, [1975, 8p. + 14 figs. and tables] MP 913	(1980, 82p.) CR 86-21 Excavation of frozen materials. Moore, H.E., et al., (1980,
Byahustion of an air cushion vehicle in Northern Alaska. Abele, G., et al, [1976, 7p.] MP 894	Temporary environment. Cold regions habitability. Bech-	p.323-345 ₁ MP 1360
Air-cushion vehicle effects on surfaces of Alaska's Arctic Slopes. Slaughter, C.W., (1976, p.272-279)	tel, R.B., et al, (1976, 162p.) SR 76-18 Notes on conducting the behavior setting survey by interview	Experimental data Arching of two block sizes of model ice floes. Calkins, D.J.,
MP 1384	method. Ledbetter, C.B., [1976, 33p.] SR 76-14 Arctic transportation: operational and environmental evalua-	et al, [1976, 11p.] CR 76-42 Heat transfer over a vertical melting plate. Yen, YC., et al,
Beological and environmental consequences of off-road traf- fic in northern regions. Brown, J., [1976, p.40-53]	tion of an air cushion vehicle in northern Alaska. Abele,	[1977, 12p.] CR 77-32
MP 1303 Hovercraft ground contact directional control devices.	G., et al, (1977, p.176-182) MP 985 Architects and scientists in research for design of buildings in	Exploration Tundra recovery since 1949 near Fish Creek, Aleska. Law-
Abele, G., [1976, p.51-59] MP 275	Aiseka. Ledbetter, C.B., [1977, 8p.] CR 77-23 UV radiational effects on: Martian regolith water. Nadeau,	son, D.E., et al, [1978, 81p.] CR 78-28
Lend treatment of westewater at Manteca, Calif., and Quincy, Weshington. lekander, I.K., et al, [1977, 34p.]	P.H., (1977, 89p.) MP 1072	Explosion effects Ico-cratering experiments Blair Lake, Alaska. Kurtz, M.K.,
CR 77-24	Ecology on the Yukon-Prudhoe haul road. Brown, J., ed, [1978, 131p.] MP 1115	et al, 1966, Various pagings; MP 1834 Analysis of explosively generated ground motions using
Effects of low ground pressure vehicle traffic on tundra at Lonely, Alaska. Abele, G., et al, [1977, 32p.]	Communication in the work place: an ecological perspective.	Fourier techniques. Blowin, S.E., et al, (1976, 86p.)
Second progress report on oil spilled on permafront. McFad-	Ledbetter, C.B., [1979, 19p.] SR 79-63 Environment of the Alaskan Haul Road. Brown, J., [1980,	CR 76-28 Dynamic in-situ properties test in fine-grained permafrost.
den, T., et al, (1977, 46p.) SR 77-44	p.3-52 ₁ MP 1350 Environmental mapping of the Arctic National Wildlife Ref-	Blouin, S.E., (1977, p.282-313) MP 963
Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, (1978, p.7-36) MP 1075	uge, Alaska. Walker, D.A., et al, [1982, 59p. + 2 maps] CR \$2-37	Destruction of ice islands with explosives. Mellor, M., et al. [1978, p.753-765] MIP 1018
Effects of winter military operations on cold regions terrain.	Equipment	Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1520
Abele, G., et al, [1978, 34p.] SR 78-17 Plant recovery from Arctic oil spills. Walker, D.A., et al,	Some aspects of Soviet trenching machines. Mellor, M., [1980, 13p.] SR 88-87	High-explosive cratering in frozen and unfrozen soils in Ales-
(1978, p.242-259) MP 1184	Mechanics of cutting and boring in permafrost. Mellor, M.,	ks. Smith, N., [1980, 21p.] CR 80-09 Impact fuse performance in snow (Initial evaluation of a new
Crude oil spills on black spruce forest. Jenkins, T.F., et al., 1978, p.305-323; MP 1185	[1980, 82p.] CR 89-21 Snow and ice control on railroads, highways and airports.	test technique). Aitken, G.W., et al, [1980, p.31-45] MP 1347
Mbliography of permefrost soils and vegetation in the USSR. Andrews, M., (1978, 175p.) SR 78-19	Minak, L.D., et al, [1981, p.671-706] MP 1447	Analysis of non-steady plastic shock waves in snow. Brown,
Tundra recovery since 1949 near Fish Creek, Alaska. Law-	Snow removal equipment. Minak, L.D., [1981, p.648-670] MP 1446	R.L., (1980, p.279-287) MP 1354 Block motion from detonations of buried near-surface explo-
son, D.E., et al., (1978, 81p.) CR 78-28 Noncorrosive methods of ice control. Minsk, L.D., (1979,	Mechanics of cutting and boring in permafrost. Mellor, M., [1981, 38p.] CR 81-26	sive arrays. Blouin, S.E., (1980, 62p.) CR 86-26
p.133-162 ₇ MP 1265	Ice engineering facility. Zabilansky, L.J., et al, [1983, 12p.	Prediction of explosively driven relative displacements in rocks. Blouin, S.E., (1981, 23p.) CR 81-11
Crude oil spills on subarctic permefrost in interior Alaska. Johnson, L.A., et al, [1980, 128p.] MP 1310	+ fig.; MP 2008 Performance of a thermosyphon with an inclined evaporator	Testing shaped charges in unfrozen and frozen silt in Alaska. Smith, N., [1982, 10p.] SR 82-62
Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al. [1980, p.263-272]	and vertical condenser. Zarling, J.P., et al, [1984, p.64-68]	Breaking ice with explosives. Mellor, M., (1982, 64p.)
MP 1391	System for mounting end caps on ice specimens. Cole,	CR 52-46 Frozen soil characteristics that affect land mine functioning.
Road dust along the Haul Road, Alaska. Everett, K.R., [1980, p.101-128] MIP 1352	D.M., et al, [1985, p.362-365] MP 2016 Eresien	Richmond, P.W., (1983, 18p.) SR 83-65 Blasting and blast effects in cold regions. Part 1: Air blast.
Winter air pollution at Fairbanks, Alaska. Coutts, H.J., et al.	Some effects of air cushion vehicle operations on deep snow.	Mellor, M., (1985, 62p.) SR 85-25
(1981, p.512-528) MP 1395 Ecological impact of vehicle traffic on tundra. Abele, G.,	Abele, G., et al, [1972, p.214-241] MP 887 Road construction and maintenance problems in central Alae-	Explosives Use of explosives in removing ice jame. Prankenstein, G.E.,
[1961, p.11-37] MP 1463	ka. Clark, E.F., et al., [1976, 36p.] SR 76-08 Bank excellent of U.S. mosthern vives. Class J. W. a1982	et al, [1970, 10p.] MP 1021
[1981, p.11-37] Los growth and circulation in Kachemak Bay, Aleska. Daly, S.F., (1982, p.(C)1-(C)9) MP 1361	Bank erosion of U.S. northern rivers. Gatto, L.W., 1982, 75p.; CR 82-11	Composition of vapors evolved from military TNT. Leggett, D.C., et al, [1977, 25p.] SR 77-16
Ice growth and circulation in Kachemak Bay, Alaska. Daly, S.F., [1982, p.(C)1-(C)9] MP 1561 Loag-term active layer effects of crude oil spilled in interior	Bank erosion of U.S. northern rivers. Gatto, L.W., 1982, 75p.; CR 82-11 Erosion control	Composition of vapors evolved from military TNT. Leggett, D.C., et al. [1977, 25p.] SR 77-16 Block motion from detonations of buried near-surface explo-
loe growth and circulation in Kachemak Bay, Alaska. Daly, S.F., (1902, p.(C)1-(C)9, MP 1501 Long-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1903, p.175-179) MP 1656 Hydrologic modeling from Landset land cover data.	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Bresion control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-06	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 25p.] SR 77-16 Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1980, 62p.] CR 86-26 Mine/countermine problems during winter warfare. Lunar-
loe growth and circulation in Kachemak Bay, Alaska. Daly, S.F., (1982, p.(C)1-(C)9) Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656 Hydrologic modeling from Landset land over data. McKim, H.L., et al, (1984, 19p.) SR 84-01	Bank erosion of U.S. northern rivers. Gatto, L.W., r1982, 75p.; CR 82-11 Erosion control Revegetation and erosion control of the Trans-Alaska Pipe-	Composition of vapors evolved from military TNT. Legastt, D.C., et al., (1977, 25p.) Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., (1980, 62p.) CR 88-26 Mine/countermine problems during winter warture. Lunar-strain, V.J., ed., (1981, 43p.) Breaking ice with explosives. Mellor, M., (1982, 64p.)
Ice growth and circulation in Kachemak Bay, Alaska. Daly, S.F., (1982, p.(C)1-(C)9. MP 1591 Long-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179) MP 1656 Hydrologic modeling from Landset land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01 Environmental protection Tundra blome applies new look to ecological problems in	Bank erosion of U.S. northern rivers. Gatto, L.W., p1982, 75p.; CR 82-11 Resion control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., p1977, 36p.; SR 77-06 Utilization of sewage shudge for terrain stabilization in cold regions. Gaskin, D.A., et al., p1977, 45p.; SR 77-37 ERTS imagery	Composition of vapors evolved from military TNT. Legastt, D.C., et al. (1977, 25p.) Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., (1980, 62p.) Mine/countermine problems during winter warfare. Lunardini, V.J., ed. (1981, 43p.) Breaking ice with explosives. Mellor, M., (1982, 64p.) CR \$2-40
Ice growth and circulation in Kachemak Bay, Alaska. Daly, 3.F., (1982, p.(C)1-(C)9). MP 1991. Long-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179). MP 1656. Hydrologic modeling from Landset land cover data. McKim, H.L., et al., (1984, 199.). SR 84-01. Environmental protection. Tundra blome spiles new look to ecological problems in Alaska. Brown, J., (1970, p.9). Land disposal: state of the art. Reed, S.C., (1973, p.229-	Bank erosion of U.S. northern rivers. Gatto, L.W., r1982, 75p.; CR 82-11 Bresion control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., r1977, 36p.; SR 77-06 Utilization of sewage sludge for terrain stabilization in cold regions. Gaskin, D.A., et al., r1977, 45p.; SR 77-37 ERTS imagery. Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., r1972, p.28-30;	Composition of vapors evolved from military TNT. Legastt, D.C., et al. (1977, 25p.) Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1980, 62p.] CR 89-26 Mine/countermine problems during winter warfare. Lunaridini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] CR 82-40 Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.]
los growth and circulation in Kachemak Bay, Alaska. Daly, S.P., (1982, p.(C)1-(C)9) Long-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179) MP 1656 Hydrologic modeling from Landsst land cover data. McKim, H.L., et al, (1984, 19p.) Environmental protection Tundra bloms applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) Land disposal: state of the art. Reed, S.C., (1973, p.229-261) MP 1392	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Breates centrel Revegetation and erosion control of the Trans-Alaska Pipe- line. Johnson, L.A., et al., [1977, 36p.] SR 77-06 Utilization of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through ERTS-	Composition of vapors evolved from military TNT. Legastt, D.C., et al., (1977, 259.) Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., (1980, 62p.) CR 88-26 Mine/countermine problems during winter warfare. Lunaridini, V.J., ed., (1981, 43p.) Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 82-69 Review of the propagation of inclastic pressure waves in snow.
loe growth and circulation in Kachemak Bay, Alaska. Daly, 3.F., (1982, p.(C)1-(C)9). MP 1561 Loag-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179) MP 1656 Hydrologic modeling from Landset land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01 Environmental protection Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 880 Land dispessi: state of the art. Reed, S.C., (1973, p.229-261) MP 1392 Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.)	Bank erosion of U.S. northern rivers. Gatto, L.W., p1982, 75p.; CR 82-11 Bresion control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., p1977, 36p.; SR 77-06 Utilization of sewage sludge for terrain stabilization in cold regions. Gaskin, D.A., et al., p1977, 45p.; SR 77-37 ERTS imagery. Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., p1972, p.28-30; MP 1119 Arctic and subarctic environmental analyses utilizing BRTS-1 imagery. Anderson, D.M., et al., p1973, 5p.;	Composition of vapors evolved from military TNT. Legastt, D.C., et al., (1977, 29p.) Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., (1980, 62p.) CR 89-26 Mine/countermine problems during winter warfare. Lunaridini, V.J., ed., (1981, 43p.) Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 83-49 Review of the propagation of inelastic pressure waves in snow. Albert, D.G., (1983, 26p.) Sassonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., (1984, 35p.) SR 84-18 Chemical snalysis of munitions wastewater. Jenkins, T.F., et
loe growth and circulation in Kachemak Bay, Alaska. Daly, 3.F., (1982, p.(C)1-(C)9). MP 1991. Loag-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179). MP 1656. Hydrologic modeling from Landest land cover data. McKim, H.L., et al., (1984, 19p.). Exvironmental protection. Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9). MP 880. Land disposal: state of the art. Reed, S.C., (1973, p.229-261). Symposium: geography of polar countries; selected papers and summeries. Brown, J., ed., (1977, 61p.). SR 77-66. Municipal, shudse, menanement: environmental, factors.	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Breaton control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-06 Utilization of sewage atudge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing BRTS-1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of see ice from satellite imagery.	Composition of vapors evolved from military TNT. Legast, D.C., et al., [1977, 259.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1980, 62p.] CR 88-26 Mine/countermine problems during winter warfare. Lunaridini, V.J., ed., [1981, 43p.] SR 81-20 Breaking ice with explosives. Mellor, M., [1982, 64p.] CR 82-40 Review of the propagation of inclastic pressure waves in snow. Albert, D.G., [1983, 26p.] CR 83-13 Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] SR 84-18 Chemical analysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.]
loe growth and circulation in Kachemak Bay, Alaska. Daly, 3.F., (1982, p.(C)1-(C)9). MP 1591. Loag-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179). MP 1656. Hydrologic modeling from Landset land cover data. McKim, H.L., et al., (1984, 19p.). SR 84-01. Eavironmental protection. Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9). MP 880. Land dispensal: state of the art. Reed, S.C., (1973, p.229-261). MP 1392. Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.). SR 77-46. Municipal sludge management: environmental factors. Reed, S.C., ed, (1977, Var. p.). MP 1466.	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Brestos control Revegetation and erosion control of the Trans-Alaska Fipeline. Johnson, L.A., et al., [1977, 36p.] Utilization of sewage atudge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through ERTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30] MP 1119 Arctic and subarctic environmental analyses utilizing ERTS-1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesocale deformation of ses ice from satellite imagery, Anderson, D.M., et al., [1973, 2p.] MP 1129	Composition of vapors evolved from military TNT. Legastt, SR 77-16. D.C., et al., [1977, 25p.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [190, 62p.] CR 86-26. Mine/countermine problems during winter warfare. Lunardimi, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1933, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] CR 86-29
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(0)1-(C)9) Loag-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179) MP 1656 Hydrologic modeling from Landset land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01 Environmental protection Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p. 9) MP 880 Land disposal: state of the art. Reed, S.C., (1973, p.229-261) Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) Municipal sludge management: environmental factors. Reed, S.C., ed, (1977, Var. p.) MP 1406 Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978,	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Bresion control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-06 Utilization of sewage atudge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing BRTS-1 imagery. Anderson, D.M., et al., [1973, 3p.] MP 1611 Mesoscale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] MP 1120 Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] MP 1836	Composition of vapors evolved from military TNT. Legastt, D.C., et al., (1977, 259.) Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., (1980, 62p.) CR 88-26 Mine/countermine problems during winter warfare. Lunastini, V.J., ed., (1981, 43p.) SR 81-20 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 83-13 Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., (1984, 35p.) SR 84-18 Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., (1984, 93p.) Penetration of shaped charges into ice. Mellor, M., (1984, p.137-148) Explosive obscuration sub-test results at the SNOW-TWO field experiment. Eberaole, J.F., et al., (1984, p.347-334)
loe growth and circulation in Kachemak Bay, Alaska. Daly, 3.F., (1982, p.(C)1-(C)9). MP 1561 Loag-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179). MP 1656 Hydrologic modeling from Landsst land cover data. McKim, H.L., et al., (1984, 19p.). SR 84-01 Environmental protection Tandra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9). MP 880 Land dispessi: state of the art. Reed, S.C., (1973, p.229-261). Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.). SR 77-66 Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.). MP 1466 Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205). MP 1666	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Graphy CR 82-11 Breates centrel Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-96 Utilization of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through ERTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MF 1119 Arctic and subarctic environmental analyses utilizing ERTS-1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.) Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1973, 6p.) MF 1631	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 259.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [190, 62p.) CR 88-26. Mins/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] SR 81-28. Breaking ice with explosives. Mellor, M., [1982, 64p.] CR 82-40. Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] CR 83-13. Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] SR 84-18. Chemical snalysis of munitions wastewater. Jenkins, T.P., et al., [1984, 95p.] CR 84-29. Penetration of shaped charges into ice. Mellor, M., [1984, p. 137-148] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, p. 347-354). Explosives in soils and sediments. Cragin, J.H., et al., [1985,
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(0)-(C)9) Loag-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179) MP 1656 Hydrologic modeling from Landsst land over data. McKim, H.L., et al., (1984, 19p.) MP 1656 Environmental protection Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 800 Land disposal: state of the art. Reed, S.C., (1973, p.229-261) SP 200-261; MP 1992 Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SP 77-66 Municipal sludge management: environmental factors. Reed, S.C., ed, (1977, Var. p.) MP 1406 Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) MP 1958 Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) MP 1319	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Breston control Revegetation and erosion control of the Trans-Alaska Fipe- line. Johnson, L.A., et al., [1977, 36p.] SR 77-36 Utilization of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS leagury Arctic and subarctic environmental analysis through BRTS- 1 imagery. Anderson, D.M., et al., [1972, p.28-30) MP 1119 Arctic and subarctic environmental analyses utilizing BRTS- 1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1616 Mesocale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1973, 6p.] BRTS mapping of Arctic and subarctic environments. And- BRTS mapping of Arctic and subarctic environments.	Composition of vapors evolved from military TNT. Legast, D.C., et al., [1977, 25p.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [190, 62p.] Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.O., [1983, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] Chemical snalysis of munitions wastewater. Jenkins, TF., et al., [1984, 95p.] Penetration of shaped charges into ice. Mellor, M., [1984, p. 137-148] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, p. 347-354) MP 1872
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(C)1-(C)9. 3,F., (1982, p.(C)1-(C)9. 1, (1983, p.175-179) MP 1656. 1, (1984, p.19-) SR 84-01. 1, (1984, p.19-) SR 84-01. 1, (1984, p.19-) SR 84-01. 1, (1984, p.19-) MP 1860. 1, (1984, p.19-) SR 77-66. 1, (1984, p.19-) SR 77-66. 1, (1984, p.19-) MP 1860. 1, (1984, p.19-) SR 77-66. 1, (1984, p.19-) MP 1860. 1, (1984, p.19	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Graph CR 82-11 Breates centrel Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] GR 77-96 Utilization of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] ERTS tenagery Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing ERTS-1 imagery. Anderson, D.M., et al., [1973, 3p.] MP 1611 Mesoscale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses from BRTS magery. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] Liands of grounded ice. Kovacs, A., et al., [1975, p.213-	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 259.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1980, 62p.] CR 89-26. Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] SR 81-28. Breaking ice with explosives. Mellor, M., [1982, 64p.] CR 82-40. Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] CR 83-13. Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] SR 84-18. Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] CR 84-29. Penetration of shaped charges into ice. Mellor, M., [1984, p. 137-148] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, p. 347-354, MP 1972. Explosive in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, 33p.]
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(C)1-(C)9) Loag-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179) MP 1656 Hydrologic modeling from Landest land cover data. McKim, H.L., et al., (1984, 19p.) Environmental protection Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 880 Land disposal: state of the art. Reed, S.C., (1973, p.229-261) SPM posium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-66 Municipal sludge management: environmental factors. Reed, S.C., ed, (1977, Var. p.) MP 1406 Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) MP 1698 Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) MP 1519 Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1520 Biological restoration strategies in relation to nutrients at a	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Bresion control Revegetation and erosion control of the Trans-Alaska Pipe- line. Johnson, L.A., et al., [1977, 36p.] Utilization of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through ERT3- 1 imagery. Anderson, D.M., et al., [1972, p.28-30). MP 1119 Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of see ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1973, 6p.] MP 1631 ERTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.) MP 1647	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 25p.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.) CR 88-26 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., (193, 26p.) Saesonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] CR 84-18 Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] CR 84-29 Penetration of shaped charges into ice. Mellor, M., [1984, p. 137-148] Raplosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, p. 147-354, p. 15p.] Explosives in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, 33p.] SR 85-22 Sorption of military explosive contaminants on bentonite drilling muds. Leggett, D.C., [1985, 33p.]
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(C)1-(C)9. 3,F., (1982, p.(C)1-(C)9. 1, (1983, p.175-179) MP 1656. Hydrologic modeling from Landset land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01. Environmental protection Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.5) MP 860. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-46 Municipal sludge menagement: environmental factors. Reed, S.C., ed, (1977, Var. p.) Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.284-290) MP 1519 Oround pressures exerted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1520 Biological restoration strategies in relation to nutrients at a subscretic site in Pairbanks, Alaska. Johnson, L.A., (1978, MP) 1666 MP 1160	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Graph CR 82-11 Breslea centrel Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] RT 197-30 SR 77-30 ERTS imagery Arctic and subarctic environmental analysis through BRT3-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing BRT3-1 imagery. Anderson, D.M., et al., [1973, 3p.] Mesoscale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of Gretic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of Gretic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of Gretic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of BRTS mineral analyses from BRTS mineral analy	Composition of vapors evolved from military TNT. Legastt, D.C., et al., (1977, 259.) Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., (1980, 62p.) CR 89-26. Mine/countermine problems during winter warters. Lunardini, V.J., ed., (1981, 43p.) SR 81-20. Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 82-40. Review of the propagation of inelastic pressure waves in snow. Albert, D.G., (1983, 26p.) CR 83-13. Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., (1984, 35p.) SR 84-18. Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., (1984, 95p.) CR 82-29. Penetration of shaped charges into ice. Mellor, M., (1984, p. 137-145) Baplosive obscuration sub-test results at the SNOW-790 field experiment. Ebersole, J.F., et al., (1984, p. 347-354). Baplosive in soils and sediments. Cragin, J.H., et al., [1985, 33p.) SR 85-22. Sorption of military explosive contaminants on bentonite crilling muds. Legett, D.C., (1985, 33p.) CR 85-18. Extraterrestrial ice.
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3.F., (1982, p.(C)1-(C)9. 3.F., (1982, p.(C)1-(C)9. 3.F., (1982, p.(C)1-(C)9. 1. Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modeling from Landsst land over data. McKim, H.L., et al., (1984, 19p.) SR 84-01. Eavironmental protection Tundra blooms applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 880. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-66. Municipal sludge management: environmental factors. Reed, S.C., ed, (1977, Var. p.) Reed, S.C., ed, (1977, Var. p.) Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.284-290) Biological restoration strategies in relation to nutrients at a subarctic site in Pairbanks, Alaska. Johnson, L.A., (1978, p.284-290)	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Graphy CR 82-11 Bresion control Revegetation and erosion control of the Trans-Alaska Pipe- line. Johnson, L.A., et al., [1977, 36p.] SR 77-36 Utilization of sewage sludge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through ERT3- 1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1974, 128p.] BETS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] IRP 1631 ERTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] IRP 1647 Islands of grounded ice. Kovacs, A., et al., [1975, p.213- 216) Estuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. Catto, L.W., [1978, 79p.] CR 78-18	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 25p.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.) CR 84-26 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] Review of the propagation of inelastic pressure vaves in snow. Albert, D.G., [1983, 26p.] Review of the propagation of inelastic pressure vaves in snow. Albert, D.G., [1983, 26p.] Resident propagation of inelastic pressure vaves in snow. Albert, D.G., [1984, 35p.] SR 84-18 Chemical snalysis of munitions wastewater. Jenkina, T., R. & 41, [1984, 95p.] Raplosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, p. 147-354, 18p.] Explosives in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Explosives in soils and sediments. Cragin, J.H., et al., [1985, 13p.] Extratervestrial ice Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976, (1977, 161p.) MF 911
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(0)-(C)9) Loag-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179) MP 1656 Hydrologic modeling from Landsst land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01 Environmental protection Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 880 Land disposal: state of the art. Reed, S.C., (1973, p.229-261) Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-96 Municipal sludge management: environmental factors. Reed, S.C., ed, (1977, Var. p.) Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.224-290) MP 1520 Biological restoration strategies in relation to nutrients at a subsercite site in Pairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Workshop on Barvironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1106 Workshop on Barvironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1104 Building materials and acid precipitation. Merry, C.J., et al.	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Bresion control Revegetation and erosion control of the Trans-Alaska Fipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-36 Utilization of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing BRTS-1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesocale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 6p.] MP 129 Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] Islands of grounded ice. Kovacs, A., et al., [1975, p.213-216) MP 852 Esteuries Betusrine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. CR 78-18 Evaperation	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 25p.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.] CR 86-26 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.O., [1933, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] Penetration of shaped charges into ice. Mellor, M., [1984, p.137-14b] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Eberacle, J.F., et al., [1984, 347-354, MP 1872 Explosives in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, 33p., SR 85-22 Sorption of military explosive contaminants on bestonite drilling muds. Leggett, D.C., [1985, 33p., CR 85-18 Extraterrestrial ics. Colloquium on Water in Planetary Regoliths, Hanover, N.H.,
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3.F., (1982, p.(C)1-(C)9. 3.F., (1982, p.(C)1-(C)9. 1. S.F., (1982, p.(C)1-(C)9. 1. Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modeling from Landsst land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01. Eavironmental protection Tundra bioma applies new look to ecological problems in Alaska. Brown, J., (1970, p.5) MP 880. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) MP 1992. Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-46. Municipal sludge management: environmental factors. MP 1866. Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) MP 1819. Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.202-205) MP 1819. Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.202-205) MP 1819. Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.204-290) MP 1820. Biological restoration strategies in relation to nutrients at a subsercite site in Fairbanks, Alaska. Johnson, L.A., (1978, p.460-466) MP 1314. Building materials and acid precipitation. Merry, C.J., et al. (1985, 40p.) Vegetation recovery in the Cape Thompson region, Alaska.	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, T5p.] Greatea control Revegetation and erosion control of the Trans-Alaska Pipe- line. Johnson, L.A., et al., [1977, 36p.] Revegetation of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through ERTS- 1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 5p.] MP 1831 ERTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.) MP 1831 ERTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, p.213- 216) Estuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. Catto, L.W., [1978, 79p.] Evaperation Radistion and evaporation heat loss during ice fog conditions. McPadden, T., [1975, p.18-27] MP 1851	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 258] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.) CR 89-26 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] SR 81-28 Breaking ice with explosives. Mellor, M., [1982, 64p.] CR 82-40 Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] CR 83-13 Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] SR 84-18 Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] CR 84-29 Penetration of shaped charges into ice. Mellor, M., [1984, p. 137-148] Raplosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, p. 347-354, p. 137-148] Explosives in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, SR 85-22 Sorption of military explosive contaminants on beatomite drilling muds. Leggett, D.C., [1985, 33p.] CR 85-18 Extratervestrals ice Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976, [1977, 161p.] MF 911 Mars soil-water analyzer: instrument description and status. Anderson, D.M., et al., [1977, p. 149-158] MF 912 Palling bedies
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(0)-(C)9) Loag-term active layer effects of crude oil spilled in interior Alaska. Collins, C.M., (1983, p.175-179) MP 1656 Hydrologic modeling from Landsst land cover data. McKim, H.L., et al., (1984, 19p.) MP 1656 Hydrologic modeling from Landsst land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01 Environmental protection Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 880 Land disposal: state of the art. Reed, S.C., (1973, p.229-261) Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-66 Municipal sludge management: environmental factors. Reed, S.C., ed, (1977, Var. p.) Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) Biological restoration strategies in relation to nutrients at a subserctic site in Pairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Workshop on Barvironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1150 Workshop on Barvironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1199 Vegstation recovery in the Cape Thompson region, Alaska. Breestt, K.R., et al., (1985, 75p.) CR 88-11	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Bresion control Revegetation and erosion control of the Trans-Alaska Pipe- line. Johnson, L.A., et al., [1977, 36p.] SR 77-08 Utilization of sewage shudge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through ERT3- 1 imagery. Anderson, D.M., et al., [1972, p.28-30). MP 1119 Arctic and subarctic environmental analyses utilizing ERTS- 1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of see ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] MP 1620 Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1974, 128p.] MP 1631 ERTS imagery. Anderson, D.M., et al., [1975, p.213- 216) Estacrice Batuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. Gatto, L.W., [1978, 79p.] Evageration Radiation and evaporation heat loss during ice fog conditions. McPadden, T., [1975, p.18-27] Liboratory tests and analysis of thermosyphons with inclined evaporators sections. Zarling, J.P., et al., [1985, p.31-37]	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 252,] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.] Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.O., [1933, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] CR 84-29 Penetration of shaped charges into ice. Mellor, M., [1984, p.137-14b] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Eberacle, J.F., et al., [1984, 347-334, MP 1975 Explosives in soils and sediments. Cragin, J.H., et al., [1985, 11p.) SR 85-22 Sorption of military explosive contaminants on bentonite drilling muds. Leggett, D.C., [1985, 33p.] Extraterrestrial ice Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976, [1977, 161p.] MF 911 Palling bedies Airborne-Snow Concentration Measuring Equipment. Lacombe, J., [1982, p.17-46]
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3.F., (1982, p.(C)1-(C)9. 3.F., (1982, p.(C)1-(C)9. 1. S.F., (1982, p.(C)1-(C)9. 1. Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modeling from Landsst land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01. Eavironmental protection Tundra bioms applies new look to ecological problems in Alaska. Brown, J., (1970, p.5) MP 880. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-46. Municipal sludge management: environmental factors. MP 1866. Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) MP 1859. Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) MP 1859. Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.202-205) MP 1859. Biological restoration strategies in relation to nutrients at a subsercit site in Fairbanks, Alaska. Johnson, L.A., (1978, p.460-466) MP 1314. Bilding materials and acid precipitation. Merry, C.J., et al., (1985, 40p.) Land Guidelines for architectural programming of office settings.	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Bresion control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-36 Utilization of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing BRTS-1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of see ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 5p.] MP 1630 Arctic and subarctic environmental analyses from BRTS imagery. Anderson, D.M., et al., [1973, 6p.] MP 1831 BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] MP 1847 Islands of grounded ice. Kovacs, A., et al., [1975, p.213-216] Estuarise Retuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. Catto, L.W., [1978, 79p.] Expectation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.13-27] Laboratory tests and analysis of thermosyphons with inclined evaporator sections. Zarling, J.P., et al., [1985, p.31-37, MP 1853 Heat transfer characteristics of thermosyphons with inclined	Composition of vapors evolved from military TNT. Legasti, D.C., et al., [1977, 25p.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.] Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] Chemical analysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] Penetration of shaped charges into ice. Mellor, M., [1984, p.137-14b] Bxplosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, p.347-354, MFP 1975] Bxplosive in soils and sediments. Cragin, J.H., et al., [1985, 33p.] Rxfststrevestral ice Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976. (1977, 161p.) Mrs 3010-water analyzer: instrument description and status. Anderson, D.M., et al., [1977, p.149-158] MrP 912 Palling bedies Airbotne-Snow Concentration Measuring Equipment. La-
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(C)1-(C)9. 3,F., (1982, p.(C)1-(C)9. Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modeling from Landset land cover data. McKim, H.L., et al., (1984, 19p.) MP 1656. Environmental protection Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 860. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-66. Municipal sludge menagement: environmental factors. Reed, S.C., ed, (1977, Var. p.) Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.284-290) MP 1519 Oround pressures exerted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1520 Biological restoration strategies in relation to nutrients at a subservic site in Pairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Workshop on Bavironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1100 Workshop on Bavironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1100 Workshop on Bavironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1100 Workshop on Bavironmental Protection of Permafrost Terrain. Brown, J., et al., (1985, 75p.) CR 85-11 Environmental tests Gudelines for architectural programming of office settings. Lodebetter, C.B., (1977, 14p.) SR 77-85	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11 Brestee centrel Revegetation and erosion control of the Trans-Alaska Pipe- line. Johnson, L.A., et al., [1977, 36p.] SR 77-08 Utilization of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through ERT3- 1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing ERT3- 1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1974, 128p.] MP 1631 ERTS imapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] Islands of grounded ice. Kovacs, A., et al., [1975, p.213- 216) Estuarise Betuarine processes and intertidal habitats in Grays Harbor, Washingston: a demonstration of remote sensing techniques. Oatto, L.W., [1978, 79p.] Evaperation Rediation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] Laboratory tests and analysis of thermosyphons with inclined evaporator sections. Haynes, F.D., et al., [1986, p.285-	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 25p.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.] CR 88-26 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1933, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] CR 84-29 Penetration of shaped charges into ice. Mellor, M., [1984, p. 137-148] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, 9347-334, http://dx.discoveresides.com/mrf 1976 Explosives in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, 33p.] SR 85-22 Sorption of military explosive contaminants on bentonite drilling muds. Leggett, D.C., [1985, 33p.] Extraterrestrial ice Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976. [1977, 161p.] Mars soil-water snalyzer: instrument description and status. Anderson, D.M., et al., [1977, p.149-158] Palling bedies Airborne-Saow Concentration Measuring Equipment. Lacombe, J., [1982, p.17-46] Part ice. Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.9-34]
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(C)1-(C)9. 3,F., (1982, p.(C)1-(C)9. Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modeling from Landsst land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01. Eavironmental protection Tundra bioma spilies new look to ecological problems in Alaska. Brown, J., (1970, p.5) MP 880. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) MP 1992. Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-46. Municipal sludge management: environmental factors. MP 1866. Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) MP 1859. Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) MP 1859. Ground pressures exacted by underground explosions. Johnson, P.R., (1978, p.202-205) MP 1819. Ground pressures exacted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1820. Biological restoration strategies in relation to nutrients at a subsercit site in Pairbanks, Alaska. Johnson, L.A., (1978, p.460-466) MP 1314. Bibliding materials and acid precipitation. Merry, C.J., et al. (1980, p.30-36) MP 1314. Bibliding materials and acid precipitation. Merry, C.J., et al. (1985, 75p.) Exvirusmental tests Guddelines for architectural programming of office settings. Ledbetter, C.B., (1977, 14p.) SR 77-85.	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Brestee centrel Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] Utilization of sewage shudge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing BRTS-1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses from BRTS imagery. Anderson, D.M., et al., [1974, 128p.] BRTS mapping of Arctic and subarctic environmenta. Anderson, D.M., et al., [1974, 128p.) BRTS mapping of Arctic and subarctic environmenta. Anderson, D.M., et al., [1974, 128p.) RP 1647 Islands of grounded ice. Kovacs, A., et al., [1975, p.213-216] Extensive Returnine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. Catto, L.W., [1978, 79p.] Evaperation Redistion and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] Laboratory tests and analysis of thermosyphons with inclined evaporator sections. Zarting, J.P., et al., [1985, p.31-37, MP 1853 Heat transfer characteristics of thermosyphons with inclined evaporator sections. Haynes, F.D., et al., [1986, p.285-292]	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 250,] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.] CR 86-26 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.O., [1933, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] CR 84-29 Penetration of shaped charges into ice. Mellor, M., [1984, p.137-14b] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Eberacle, J.F., et al., [1984, 347-354, MFP 187-11p.] Explosives in soils and sediments. Cragin, J.H., et al., [1985, 33p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, 33p.] SR 85-22 Sorption of military explosive contaminants on bestonite drilling muds. Leggett, D.C., [1985, 33p.] CR 85-18 Extraterrestrical ics Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976, [1977, 161p.] MP 911 Mars soil-water analyzer: instrument description and status. Anderson, D.M., et al., [1977, p.149-158] MP 912 Palling bedies Airborne-Snow Concentration Measuring Equipment. Lecombe, J., [1982, p.17-46] Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.9-34] Grounded ice along the Alaskan Beaufort Sea coast. Koveca, A., [1976, 21p.] CR 85-18
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3.F., (1982, p.(C)1-(C)9. 3.F., (1982, p.(C)1-(C)9. 1. Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modeling from Landste land over data. McKim, H.L., et al., (1984, 19p.) MP 1656. Eavironmental protection Tundra blooms applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 280. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-66. Municipal sludge management: environmental factors. Reed, S.C., 64, (1977, var. p.) Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.204-290) Biological restoration strategies in relation to nutrients at a subarctic site in Pairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Workahop on Bavironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1316 Workahop on Bavironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1316 Building materials and acid precipitation. Merry, C.J., et al., (1985, 40p.) Vegetation recovery in the Cape Thompson region, Alaska. Bravecut, K.R., et al., (1985, 75p.) Eaviewents tests Guidelines for architectural programming of office settings. Lodelines for architectural programming of office settings. Lodelines for architectural programming of office settings. Lodelines for schitectural programming of office settings. Lodelines for beautiful factors affecting army operations. Saturder of the programming of the programming of the production of programming of office settings. Lodelines for schitectural programming of office settings. Lodelines for schitectural programming	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Bresion control Revegetation and erosion control of the Trans-Alaska Fipeline. Johnson, L.A., et al., [1977, 36p.] Revegetation and erosion control of the Trans-Alaska Fipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-36 Utilization of sewage aludge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery. Anderson, D.M., et al., [1972, p.28-30] Arctic and subarctic environmental analysis through ERTS-1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1119 Arctic and subarctic environmental analyses utilizing ERTS-1 imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] MP 1129 Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1973, 6p.] MP 1831 BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.) MP 1831 SRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.) MP 1852 Estuarise Betuarise processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. CR 78-18 Evaperation Radiation and evaporation heat loss during ice fog conditions. MF 1851 Laboratory tests and analysis of thermosyphons with inclined evaporator sections. Zarling, J.P., et al., [1985, p.31-37, MP 1853 Heat transfer characteristics of thermosyphons with inclined evaporator sections. Haynes, F.D., et al., [1986, p.285-292] 1986.	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 25p.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.) CR 85-26 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1983, 26p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1984, 35p.] SR 84-18 CR 84-18 Chemical snaysis of munitions wastewater. Jenkina, T., et al., [1984, 95p.] CR 84-29 Penetration of shaped charges into ice. Mellor, M., [1984, p. 137-148] Raplosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1944, p. 147-354] Explosives in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Explosives in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, 23p.] SR 85-22 Sorption of military explosive contaminants on bentonite drilling muds. Leggett, D.C., [1985, 33p.] CR 85-18 Extratervestrial ice Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976, (1977, 161p.) Mars soil-water analyzer: instrument description and status. Anderson, D.M., et al., [1977, p.149-158] Palling bedies Airborne-Snow Concentration Measuring Equipment. Lacombe, J., [1982, p.17-46] Past Ice Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.9-34] Grounded ice along the Alaskan Beaufort Sea coast. Kovaca, A., [1976, 21p.]
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(C)1-(C)9. 3,F., (1982, p.(C)1-(C)9. Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modeling from Landset land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01. Eavironmental protection Tundra bioma spiles new look to ecological problems in Alaska. Brown, J., (1970, p.5) MP 880. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) MP 1992. Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-46. Municipal sludge management: environmental factors. MP 1866. Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) MP 1859. Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) MP 1859. Ground pressures exacted by underground explosions. Johnson, P.R., (1978, p.202-205) MP 1819. Ground pressures exacted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1829. Biological restoration strategies in relation to nutrients at a subsectic site in Pairbanks, Alaska. Johnson, L.A., (1978, p.460-466) MP 1314. Building materials and acid precipitation. Merry, C.J., et al. (1985, 40p.) Vegetation recovery in the Cape Thompson region, Alaska. Bverest, K.R., et al. (1980, p.30-36) MP 1314. Eavironmental tests Guidelines for architectural programming of office settings. Ledbetter, C.B., (1977, 14p.) SR 77-85. Eavironmental factors affecting army operations. Sater, J.E., ed. (1982, 11p.) MP 881	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Bresion control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-37 BRTS imagery Arctic and subarctic environmental analysis through ERT3-I imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing ERTS-I imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of ses ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1974, 26p.] BRTS imagery. Anderson, D.M., et al., [1975, p.13-216] ERTS imagery. Anderson, D.M., et al., [1975, p.213-216] Experises Batuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. Gatto, L.W., [1978, 79p.] Experistion Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] Liboratory tests and analysis of thermosyphons with inclined evaporator sections. Zarling, J.P., et al., [1986, p.285-292] MP 2834 Excevation Kinematics of continuous belt machines. Mellor, M., [1976, 24p.] Kinematics of axial rotation machines. Mellor, M., [1976, 24p.]	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 252,] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.] CR 86-26 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.O., [1933, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] CR 84-29 Penetration of shaped charges into ice. Mellor, M., [1984, 95p.] CR 84-29 Penetration of shaped charges into ice. Mellor, M., [1984, p.137-14b] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Eberacle, J.F., et al., [1984, 347-334, MP 1872 Explosives in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Sopption of military explosive contaminants on bentonite drilling muds. Leggett, D.C., [1985, 33p.] CR 85-18 Extraterrestrial ice Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976. [1977, 161p.] MF 911 Palling bedies Airborne-Snow Concentration Measuring Equipment. Lacombe, J., [1982, p.17-46] Past ice Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.9-MF 1300 Grounded ice along the Alaskan Beaufort Sea coast. Kovecs, A., [1976, 21p.] Dynamics of near-shore ice. Kovacs, A., et al., [1977, p.106-112] Movement of coastal sea ice near Prudhoe Bay. Weeks,
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3.F., (1982, p.(C)1-(C)9. 3.F., (1982, p.(C)1-(C)9. 1. Cap-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modeling from Landste land over data. McKim, H.L., et al., (1984, 19p.) MP 1656. Eavironmental protection Tundra blome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 280. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-66. Municipal sludge management: environmental factors. Reed, S.C., ed, (1977, var. p.) MP 1392. Symposium: developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) MP 1668. Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) MP 1669. Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.204-290) MP 1669. Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.204-290) MP 1669. Surface protection strategies in relation to nutrients at a subarctic site in Pairbanks, Alaska. Johnson, L.A., (1978, p.460-466) MP 1130 Workahop on Bavironmental Protection of Permafrost Terrain. Brown, J., et al., (1980, p.30-36) MP 1314 Building materials and acid precipitation. Merry, C.J., et al., (1981, 75p.) Vegetation recovery in the Cape Thompson region, Alaska. Brownessures exercite covironmental factors affecting army operations. Set. Tundra blome program. Brown, J., (1970, p.1278) Revironmental setting, Barrow, Alaska. Brown, J., (1970, p.1278) Revironmental setting, Barrow, Alaska. Brown, J., (1970, p.1278)	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Breston control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-36 Utilization of sewage shudge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing BRTS-1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of see ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 5p.] MP 1129 Arctic and subarctic environmental analyses from BRTS imagery. Anderson, D.M., et al., [1973, 6p.] MP 1830 Arctic and subarctic environmental analyses from BRTS imagery. Anderson, D.M., et al., [1974, 128p.] MP 1841 Islands of grounded ice. Kovacs, A., et al., [1975, p.213-216] Estuarise Retuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. Gatto, L.W., [1978, 79p.] Expectation Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.13-27] Laboratory tests and analysis of thermosyphons with inclined evaporator sections. Zarling, J.P., et al., [1985, p.31-37, MP 1853 Heat transfer characteristics of thermosyphons with inclined evaporator sections. Haynes, F.D., et al., [1986, p.285-292] Excavation Kinematics of continuous belt machines. Mellor, M., [1976, 45p.] CR 76-17 Kinematics of axial rotation machines. Mellor, M., [1976, 45p.] CR 76-17	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 259.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.] Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.O., [1983, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] Penetration of shaped charges into ice. Mellor, M., [1984, p.137-148] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Boeroole, J.F., et al., [1984, p.347-354, MP 1872] Explosive in soils and sediments. Cragin, J.H., et al., [1985, 33p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, 33p.] Extratervertest les Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. S-7, 1976. [1977, 161p.] Mars soil-water snalyzer: instrument description and status. Anderson, D.M., et al., [1977, p.149-158] Palling bedies Airborne-Snow Concentration Measuring Equipment. Lacombe, J., [1982, p.17-46] Past ice Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.9-34] Grounded ice along the Alaskan Beaufort Sea coast. Kovaca, A., [1976, 21p.] Dynamics of near-shore ice. Kovaca, A., et al., [1977, p.106-112] Movement of coastal sea ice near Prudhoe Bay. Weeks, MP 1966 Decay patterns of land-fast sea ice in Canada and Alaska. MP 1966 Decay patterns of land-fast sea ice in Canada and Alaska. MP 1966
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(C)1-(C)9. 3,F., (1982, p.(C)1-(C)9. Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modelling from Landset land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01. Environmental protection Tundra biome applies new look to ecological problems in Alaska. Brown, J., (1970, p.5) MP 880. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) MP 1992. Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-46. Municipal sludge management: environmental factors. MP 1496. Roed, S.C., ed, (1977, Var. p.) SR 77-46. Municipal sludge management: environmental factors. MP 1496. Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1519 Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1520 Biological restoration strategies in relation to nutrients at a subsectic site in Pairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Workshop on Bavironmental Protection of Permafrost Terrain. Brown, J., et al. (1980, p.30-36) MP 1314 Building materials and acid precipitation. Merry, C.J., et al. (1985, 40p.) Vegetation recovery in the Cape Thompson region, Alaska. Brown, J., (1978, p.40-44) Ravironmental tests Guidelines for architectural programming of office settings. Ledbetter, C.B., (1977, 14p.) SR 77-85 Environmental setting, Barrow, Alaska. Brown, J., (1970, p.1278) MP 881 Ravironmental setting, Barrow, Alaska. Brown, J., (1970, p.1278) MP 985 Tundra blome applies new look to ecological problems in	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Bresion control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] RRTS imagery Arctic and subarctic environmental analysis through ERT3-I imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing ERTS-I imagery. Anderson, D.M., et al., [1973, 5p.] MP 11611 Mesoscale deformation of see ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 3p.] Arctic and subarctic environmental analyses from ERTS imagery. Anderson, D.M., et al., [1973, 6p.] BETS imagery. Anderson, D.M., et al., [1975, p.] BETS imagery. Anderson, D.M., et al.,	Composition of vipors evolved from military TNT. Legastt, D.C., et al., [1977, 25p.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.] CR 86-26 Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.G., [1933, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] CR 83-13 Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] CR 84-29 Penetration of shaped charges into ice. Mellor, M., [1984, p.137-14b] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, 9347-334, p.137-14b] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, 9347-334, p.137-14b] Explosive in soils and sediments. Cragin, J.H., et al., [1985, 11p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, 33p.] SR 85-22 Sorption of military explosive contaminants on bentonite drilling muds. Leggett, D.C., [1985, 33p.] Extraterrestrial ice Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976. [1977, 161p.] Marri soil-water snalyzer: instrument description and status. Anderson, D.M., et al., [1977, p.149-158] Palling heddes Airborne-Snow Concentration Measuring Equipment. Lecombe, J., [1982, p.17-46] Past ice Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.9-MP 1300] Grounded ice along the Alaskan Beaufort Sea coast. Kovecs, A., (1976, 21p.) Dynamics of near-shore ice. Kovaca, A., et al., [1977, p.133-546] Decay patterns of land-fast sea ice in Canada and Alaska. Blellic, M.A., (1977, p.110) MP 1161
loe growth and circulation in Kachemak Bay, Alaska. Dely, 3,F., (1982, p.(C)1-(C)9. 3,F., (1982, p.(C)1-(C)9. Loag-term active layer effects of crude oil spilled in interior Alaska. Colline, C.M., (1983, p.175-179) MP 1656. Hydrologic modelling from Landset land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01. Environmental protection Tundra biome applies new look to ecological problems in Alaska. Brown, J., (1970, p.5) MP 880. Land disposal: state of the art. Reed, S.C., (1973, p.29-261) MP 1992. Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, (1977, 61p.) SR 77-46. Municipal sludge management: environmental factors. MP 1496. Roed, S.C., ed, (1977, Var. p.) SR 77-46. Municipal sludge management: environmental factors. MP 1496. Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., (1978, p.202-205) Surface protection measures for the Arctic Slope, Alaska. Johnson, P.R., (1978, p.202-205) Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1519 Ground pressures exerted by underground explosions. Johnson, P.R., (1978, p.284-290) MP 1520 Biological restoration strategies in relation to nutrients at a subsectic site in Pairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Workshop on Bavironmental Protection of Permafrost Terrain. Brown, J., et al. (1980, p.30-36) MP 1314 Building materials and acid precipitation. Merry, C.J., et al. (1985, 40p.) Vegetation recovery in the Cape Thompson region, Alaska. Brown, J., (1978, p.40-44) Ravironmental tests Guidelines for architectural programming of office settings. Ledbetter, C.B., (1977, 14p.) SR 77-85 Environmental setting, Barrow, Alaska. Brown, J., (1970, p.1278) MP 881 Ravironmental setting, Barrow, Alaska. Brown, J., (1970, p.1278) MP 985 Tundra blome applies new look to ecological problems in	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] Breston control Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] Revegetation and erosion control of the Trans-Alaska Pipeline. Johnson, L.A., et al., [1977, 36p.] SR 77-36 Utilization of sewage shudge for terrain stabilization in cold regions. Gaskin, D.A., et al., [1977, 45p.] SR 77-37 ERTS imagery Arctic and subarctic environmental analysis through BRTS-1 imagery. Anderson, D.M., et al., [1972, p.28-30, MP 1119 Arctic and subarctic environmental analyses utilizing BRTS-1 imagery. Anderson, D.M., et al., [1973, 5p.] MP 1611 Mesoscale deformation of see ice from satellite imagery. Anderson, D.M., et al., [1973, 2p.] Arctic and subarctic environmental analyses. Anderson, D.M., et al., [1973, 5p.] MP 1129 Arctic and subarctic environmental analyses from BRTS imagery. Anderson, D.M., et al., [1973, 6p.] MP 1830 Arctic and subarctic environmental analyses from BRTS imagery. Anderson, D.M., et al., [1974, 128p.] MP 1841 Islands of grounded ice. Kovacs, A., et al., [1975, p.213-216] Estuarise Retuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques. Gatto, L.W., [1978, 79p.] Expectation Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.13-27] Laboratory tests and analysis of thermosyphons with inclined evaporator sections. Zarling, J.P., et al., [1985, p.31-37, MP 1853 Heat transfer characteristics of thermosyphons with inclined evaporator sections. Haynes, F.D., et al., [1986, p.285-292] Excavation Kinematics of continuous belt machines. Mellor, M., [1976, 45p.] CR 76-17 Kinematics of axial rotation machines. Mellor, M., [1976, 45p.] CR 76-17	Composition of vapors evolved from military TNT. Legastt, D.C., et al., [1977, 259.] Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1900, 62p.] Mine/countermine problems during winter warfare. Lunardini, V.J., ed., [1981, 43p.] Breaking ice with explosives. Mellor, M., [1982, 64p.] Review of the propagation of inelastic pressure waves in snow. Albert, D.O., [1983, 26p.] Seasonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al., [1984, 35p.] Chemical snalysis of munitions wastewater. Jenkins, T.F., et al., [1984, 95p.] Penetration of shaped charges into ice. Mellor, M., [1984, p.137-148] Explosive obscuration sub-test results at the SNOW-TWO field experiment. Boeroole, J.F., et al., [1984, p.347-354, MP 1872] Explosive in soils and sediments. Cragin, J.H., et al., [1985, 33p.] Explosive residues in soil. Jenkins, T.F., et al., [1985, 33p.] Extratervertest les Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. S-7, 1976. [1977, 161p.] Mars soil-water snalyzer: instrument description and status. Anderson, D.M., et al., [1977, p.149-158] Palling bedies Airborne-Snow Concentration Measuring Equipment. Lacombe, J., [1982, p.17-46] Past ice Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.9-34] Grounded ice along the Alaskan Beaufort Sea coast. Kovaca, A., [1976, 21p.] Dynamics of near-shore ice. Kovaca, A., et al., [1977, p.106-112] Movement of coastal sea ice near Prudhoe Bay. Weeks, MP 1966 Decay patterns of land-fast sea ice in Canada and Alaska. MP 1966 Decay patterns of land-fast sea ice in Canada and Alaska. MP 1966

Preferred crystal orientations in Arctic Ocean fast ice.	Creep theory for a floating ice sheet. Nevel, D.E., [1976,	Flood forecasting
Weeks, W.F., et al, [1978, 24p.] CR 78-13 See ice north of Alseks. Kovacs, A., [1978, p.7-12]	98p. ₁ SR 76-04 Arching of two block sizes of model ice flors. Calkins, D.J.,	Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01
MP 1252	et al, [1976, 11p.] CR 76-42	Ice-related flood frequency analysis: application of analytical
Dynamics of near-shore ice. Kovacs, A., et al, [1978, p.230-233] MP 1619	Concentrated loads on a floating ice sheet. Nevel, D.E., [1977, p.237-245] MP 1062	estimates. Gerard, R., et al, [1984, p.85-101] MP 1712
Oil pooling under sea ice. Kovaca, A., [1979, p.310-323] MP 1289	Integrated approach to the remote sensing of floating ice. Campbell, W.J., et al, [1977, p.445-487] MP 1069	Fleeding Inundation of vegetation in New England. McKim, H.L., et
Crystal alignments in the fast ice of Arctic Alaska. Weeks,	Compressive and shear strengths of fragmented ice covers.	al, (1978, 13p.) MP 1169
Maximum thickness and subsequent decay of lake, river and	Cheng, S.T., et al., [1977, 82p.] MP 951 Viscoelasticity of floating ice plates subjected to a circular	Land treatment systems and the environment. McKim, H.L., et al, [1979, p.201-225] MP 1414
fast sea ice in Canada and Alaska. Bilello, M.A., 1980, 160p. ₁ CR 86-06	load. Takagi, S., r1978, 32p., CR 78-05 Bearing capacity of river ice for vehicles. Nevel, D.B.,	Forage grass growth on overland flow systems. Palazzo, A.J., et al, [1980, p.347-354] MP 1402
Shore ice pile-up and ride-up: field observations, models, theoretical analyses. Kovacs, A., et al, [1980, p.209-	[1978, 22p.] CR 78-03	Removal of organics by overland flow. Martel, C.J., et al,
298 ₁ MP 1295	Buckling pressure of an elastic floating plate. Takagi, S., [1978, 49p.] CR 78-14	[1980, 9p.] MP 1362 Rational design of overland flow systems. Martel, C.J., et al,
Polarization studies in sea ice. Arcone, S.A., et al, r1980, p.225-245; MP 1324	Entrainment of ice floes into a submerged outlet. Stewart, D.M., et al, [1978, p.291-299] MP 1137	[1980, p.114-121] MP 1400 Energy and costs for agricultural reuse of wastewater. Slet-
Alaska's Beaufort Sea coast ice ride-up and pile-up features. Kovacs, A., 1983, 51p.; CR 83-09	Horizontal forces exerted by floating ice on structures. Kerr,	ten, R.S., et al, [1980, p.339-346] MP 1401
Shoreline erosion and shore structure damage on the St. Marys River. Wuebben, J.L., [1983, 36p.] SR 83-15	A.D., [1978, 9p.] CR 78-15 Problems of offshore oil drilling in the Beaufort Sea. Weller,	Overland flow: removal of toxic volatile organics. Jenkins, T.F., et al, [1981, 16p.] SR 81-01
Fetigne (materials)	G., et al, [1978, p.4-11] MP 1250 Buckling analysis of wedge-shaped floating ice sheets. Sod-	Ice jams and flooding on Ottauquechee River, VT. Bates, R., et al, [1982, 25p.] SR \$2-06
Cyclic loading and fatigue in ice. Mellor, M., et al, 1981, p.41-53 ₁ MP 1371	hi, D.S., (1979, p.797-810) MP 1232	Effects of inundation on six varieties of turfgrass. Erbisch,
Plins	Critical velocities of a floating ice plate subjected to in-plane forces and a moving load. Kerr, A.D., [1979, 12p.]	Salmon River ice jams. Cunningham, L.L., et al. [1984,
Ice fog suppression using monomolecular films. McPadden, T., (1977, p.361-367) MP 956	CR 79-19 Ice laboratory facilities for solving ice problems. Franken-	p.529-533 ₁ MP 1796 Controlling river ice to alleviate ice jam flooding. Deck,
Place Densification by freezing and thawing of fine material	stein, G.E., [1980, p.93-103] MIP 1301	D.S., (1984, p.524-528) MP 1795
dredged from waterways. Chamberlain, E.J., et al., 1978, p.622-628; MP 1163	Evaluation of ice-covered water crossings. Dean, A.M., Jr., [1980, p.443-453] MP 1348	Potential solution to ice jam flooding: Salmon River, Idaho. Barickson, J., et al. [1986, p.15-25] MIP 2131
Pires	On the buckling force of floating ice plates. Kerr, A.D., [1981, 7p.] CR 81-09	Floods Landsat data analysis for New England reservoir manage-
Symposium on fire in the northern environment. Slaughter, C.W., ed, [1971, 275p.] MP 878	Asymmetric flows: application to flow below ice jams.	ment. Merry, C.J., et al, [1978, 61p.] SR 78-06
1977 tundra fire in the Kokolik River area of Alaska. Hall,	Gögüs, M., et al, (1981, p.342-350) MP 1733 Force distribution in a fragmented ice cover. Daly, S.F., et	Port Huron ice control model studies. Calkina, D.J., et al, [1982, p.361-373] MIP 1530
1977 tundra fire at Kokolik River, Alaska. Hall, D.K., et al,	al, [1982, p.374-387] MIP 1531	Cold facts of ice jams: case studies of mitigation methods. Calkins, D.J., [1984, p.39-47] MP 1793
[1978, 11p.] SR 78-10 Recovery of the Kokolik River tundra area, Alaska. Hall,	Determining the characteristic length of model ice sheets. Sodhi, D.S., et al., [1982, p.99-104] MP 1570	Controlling river ice to alleviate ice jam flooding. Deck, D.S., 1984, p.69-761 MP 1885
D.K., et al. (1979, 15p.) MP 1638 Remote sensing of revegetation of burned tundra, Kokolik	Application of HEC-2 for ice-covered waterways. Calkins, D.J., et al, [1982, p.241-248] MP 1575	Geographic features and floods of the Ohio River. Edwardo,
River, Alaska. Hall, D.K., et al, [1980, p.263-272]	Hydraulic model study of Port Huron ice control structure.	H.A., et al, [1984, p.265-281] MIP 2003 lee jam flood prevention measures, Lamoille River, Hardwick
MP 1391 Effects of a tundra fire on soil and vegetation. Racine, C.,	Melting ice with air bubblers. Carey, K.L., [1983, 11p.]	VT. Calkina, D.J., [1985, p.149-168] MP 1940
[1980, 21p.] SR 80-37 Stabilizing fire breaks in tundra vegetation. Patterson, W.A.,	TD \$3-01 Experiments on ice ride-up and pile-up. Sodhi, D.S., et al,	Resurvey of the "Byrd" Station, Antarctica, drill hole. Gar-
III, et al, [1981, p.188-189] MP 1804	[1983, p.266-270] MP 1627	field, D.B., et al, [1976, p.29-34] MP 846 Flow rate
Recovery and active layer changes following a tundra fire in northwestern Alaska. Johnson, L., et al, £1983, p.543-	Buckling loads of floating ice on structures. Sodhi, D.S., et al, [1983, p.260-265] MP 1626	Temperature and flow conditions during the formation of
547 ₁ MP 1660 Firm	Dynamic buckling of floating ice sheets. Sodhi, D.S., 1983, p.822-833, MP 1607	river ice. Ashton, G.D., et al, [1970, 12p.] MP 1723
USA CRRBL shallow drill. Rand, J.H., [1976, p.133-137] MP 873	First-generation model of ice deterioration. Ashton, G.D.,	Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1042
Subsurface measurements of the Ross Ice Shelf, McMurdo	[1983, p.273-278] MP 2080 Deterioration of floating ice covers. Ashton, G.D., [1984,	Harnessing frazil ice. Perham, R.E., [1981, p.227-237] MP 1396
Sound, Antarctica. Kovaca, A., et al, [1977, p.146-148] MP 1613	p.26-33 ₁ MP 1676 Experimental determination of buckling loads of cracked ice	Analysis of velocity profiles under ice in shallow streams.
Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al, [1981, p.79-81] MIP 1541	sheets. Sodhi, D.S., et al, [1984, p.183-186]	Calkins, D.J., et al, [1981, p.94-111] MP 1397 One-dimensional transport from a highly concentrated, trans-
Firn quake (a rare and poorly explained phenomenon). Den-	MP 1687 Modified theory of bottom crevasses. Jezek, K.C., [1984,	fer type source. O'Neill, K., [1982, p.27-36] MIP 1489
Hartog, S.L., (1982, p.173-174) MP 1571 FiralScation	p.1925-1931 MP 2059 Porce distribution in a fragmented ice cover. Stewart, D.M.,	Ottauquechee River-analysis of freeze-up processes. Cal-
Sintering and compaction of anow containing liquid water. Colbeck, S.C., et al, [1979, p.13-32] MP 1190	et al, [1984, 16p.] CR 84-07	kins, D.J., et al, [1982, p.2-37] MIP 1738 Asymmetric plane flow with application to ice jams. Tatin-
Flexural strength	Forces associated with ice pile-up and ride-up. Sodhi, D.S., et al, (1984, p.239-262) MP 1887	chaux, J.C., et al, [1983, p.1540-1556] MP 1645 Changes in the Ross Ice Shelf dynamic condition. Jezek,
Flexural strength of ice on temperate lakes. Gow, A.J., [1977, p.247-256] MP 1063	Buckling analysis of cracked, floating ice sheets. Adley, M.D., et al, [1984, 28p.] SR 84-23	K.C., (1984, p.409-416) MIP 2058
Plexural strength of ice on temperate lakes. Gow, A.J., et al, [1978, 14p.] CR 78-09	Determining the characteristic length of floating ice sheets by	Analysis of infiltration results at a proposed North Carolina wastewater treatment site. Abele, G., et al., (1984, 24p.)
Nondestructive testing of in-service highway pavements in	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1855	SR 84-11 Constitutive relations for a planar, simple abear flow of rough
Maine. Smith, N., et al, [1979, 22p.] CR 79-06 Bending and buckling of a wedge on an elastic foundation.	Deterioration of floating ice covers. Ashton, G.D., 1985, p.177-182; MP 2122	disks. Shen, H.H., et al, [1985, 17p.] CR 85-20
Nevel, D.E., [1980, p.278-288] MP 1303 Ice characteristics in Whitefish Bay and St. Marys River in	Ice cover research—oresent state and future needs. Kerr,	Fluid dynamics Fluid dynamic analysis of volcanic tremor. Ferrick, M.G., et
winter. Vance, G.P., (1980, 27p.) SR 80-32	A.D., et al. [1986, p.384-399] MP 2004 Techniques for measurement of snow and ice on freshwater.	al, [1982, 12p.] CR 82-32 Source mechanism of volcanic tremor. Ferrick, M.G., et al,
Acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981, p.385-394]	Adams, W.P., et al. [1986, p.174-222] MP 2000 Plexural and buckling failure of floating ice sheets against	[1982, p.8675-8683] MP 1576 Calculation of advective mass transport in heterogeneous
MP 1455 Breakup of solid ice covers due to rapid water level variations.	structures. Sodhi, D.S., [1986, p.339-359] MP 2134	media. Duly, C.J., [1983, p.73-89] MP 1697
Billfalk, L., (1982, 17p.) CR 82-03 Flexural strength and elastic modulus of ice. Tatinclaux,	Floating structures Righting moment in a rectangular ice boom timber or pon-	Fluid flow Transport equation over long times and large spaces.
J.C., et al, [1982, p.37-47] MP 1568	toon. Perham, R.E., [1978, p.273-289] MP 1136 Flood control	O'Neill, K., (1981, p.1665-1675) MP 1497 Source mechanism of volcanic tremor. Ferrick, M.G., et al,
Determining the characteristic length of model ice sheets. Sodhi, D.S., et al. [1982, p.99-104] MP 1570	Construction on permafrost at Longyearbyen on Spitsbergen.	(1982, p.8675-8683) MP 1576
loe forces on model marine structures. Haynes, F.D., et al, [1983, p.778-787] MP 1606	Tobiasson, W., [1978, p.884-890] MP 1108 lee jam problems at Oil City, Pennsylvania. Deck, D.S., et	Computation of porous media natural convection flow and phase change. O'Neill, K., et al. [1984, p.213-229]
Plexural strengths of freshwater model ice. Gow, A.J., [1984, p.73-82] MP 1826	al, [1981, 19p.] SR 81-69 Bank recession and channel changes of the Tanana River,	MP 1895 Fluid mechanics
Sheet ice forces on a conical structure: an experimental study.	Alaska. Gatto, L.W., et al, [1984, 98p.] MP 1747	River ice. Ashton, G.D., [1978, p.369-392] MP 1216
Sodhi, D.S., et al. (1985, p.46-54) MP 1915 Sheet loe forces on a conical structure: an experimental study.	Tanana River monitoring and research studies near Fairbanks, Aisaka. Neill, C.R., et al, 1984, 98p. + 5 ap-	Feg Airborne snow and fog distributions. Berger, R.H., [1982,
Sodhi, D.S., et al, (1985, p.643-655) MP 1966 Uplifting forces exerted by adfrozen ice on marine piles.	penda. ₁ SR 84-37 Bank recession of the Tanana River, Alaska. Gatto, L.W.,	p.217-223 ₁ MP 1562 Snow and fog particle size measurements. Berger, R.H.,
Christensen, F.T., et al, [1985, p.529-542] MP 1905 Flexural and buckling failure of floating ice sheets against	[1984, 59p.] MP 1746	[1982, p.47-38] MP 1982 Fog dispersal
structures. Sodhi, D.S., [1986, p.339-359] MP 2134	Chena Plood Control Project and the Tanana River near Pairbanka, Alaska. Buska, J.S., et al., [1984, 11p. + figs.] MP 1745	Propane dispenser for cold fog dissipation system. Hicks,
Floating ice Bearing capacity of floating ice plates. Kerr, A.D., (1976,	Brosson analysis of the Tanana River, Alaska. Collins, C.M.,	J.R., et al, (1973, 38p.) MP 1833 Compressed air seeding of supercooled fog. Hicks, J.R.,
p.229-2681 NP 884 Cantilever beam tests on reinforced ice. Ohstrom, E.G., et	(1984, 8p. + figs.; MFP 1748 Potential solution to ice jam flooding: Salmon River, Idaho.	(1976, 9p.) SR 76-69 Suppression of ice fog from cooling ponds. McFadden, T.,
al, [1976, 12p.] CR 76-67	Earickson, J., et al. [1986, p.15-25] MP 2131	(1976, 78p.) CR 76-43

Fog dispersed (cont.)	Acoustic emissions from polycrystalline ice. St. Lawrence,	Cylindrical phase change approximation with effective ther
Use of compressed air for supercooled fog dispersal. Weinstein, A.I., et al, [1976, p.1226-1231] MP 1614	W.F., et al. (1982, 15p.) CR 82-21 Fracture toughness of model ice. Dempsey, J.P., et al.	mal diffusivity. Lunardini, V.J., [1981, p.147-154] MP 143
Ice fog suppression using reinforced thin chemical films.	[1986, p.365-376] MP 2125	Deforming finite elements with and without phase change
McFadden, T., et al, [1978, 23p.] CR 78-26	Prazil ice	Lynch, D.R., et al, [1981, p.81-96] MIP 149
Ice fog suppression using thin chemical films. McFadden, T., et al, [1979, 44p.] MP 1192	Remote sensing of frazil and brash ice in the St. Lawrence River. Dean, A.M., Jr., [1977, 19p.] CR 77-08	Effect of freezing and thawing on resilient modulus of granu lar soils. Cole, D.M., et al, [1981, p.19-26]
Ice fog suppression in Arctic communities. McFadden, T.,	Remote sensing of accumulated frazil and brash ice. Dean,	MP 148
[1980, p.54-65] MP 1357	A.M., Jr., [1977, p.693-704] MP 934	Phase change around a circular cylinder. Lunardini, V.J. [1981, p.598-600] MP 156
Ice crystal formation and supercooled fog dissipation. Kumai, M., [1982, p.579-587] MP 1539	Frazil ice formation in turbulent flow. Muller, A., et al., 1978, p.219-2341 MP 1135	[1981, p.598-600] MP 156 Guide to managing the pothole problem on roads. Eaton
Fog formation	Characteristics of ice on two Vermont rivers. Deck, D.S.,	R.A., et al, [1981, 24p.] SR 81-2:
Suppression of ice fog from cooling ponds. McFadden, T.,	[1978, 30p.] SIR 78-30	Heat conduction with phase changes. Lunardini, V.J.
[1976, 78p.] CR 76-43 Forecasting	Ice blockage of water intakes. Carey, K.L., [1979, 27p.] MP 1197	[1981, 14p.] CR 81-2: Potholes: the problem and solutions. Eaton, R.A., [1982,
Prediction and validation of temperature in tundra soils.	Accelerated ice growth in rivers. Calkins, D.J., [1979, 5p.]	p.160-162 ₃ MP 150
Brown, J., et al, [1971, p.193-197] MIP 907	CR 79-14	Piling in frozen ground. Crory, F.E., [1982, p.112-124] MP 172:
Premoval during land treatment of wastewater. Ryden, J.C., et al, [1982, 12p.] SR 82-14	Modeling of ice in rivers. Ashton, G.D., [1979, p.14/1-14/26] MP 1335	Understanding the Arctic sea floor for engineering purposes
Hydrologic forecasting using Landsat data. Merry, C.J., et	Freshwater ice growth, motion, and decay. Ashton, G.D.,	[1982, 141p.] SR 83-2
al, [1983, p.159-168] MP 1691	[1980, p.261-304] MP 1299	Conduction phase change beneath insulated heated or cooler structures. Lunardini, V.J., (1982, 40p.) CR 82-2:
Forest ecosystems Wastewater applications in forest ecosystems. McKim,	Harnessing frazil ice. Perham, R.E., [1981, p.227-237] MP 1398	Full-depth and granular base course design for frost areas
H.L., et al, [1982, 22p.] CR 82-19	Hydraulic model study of a water intake under frazil ice con-	Eaton, R.A., et al, [1983, p.27-39] MIP 1492
FOREST FIRES	ditions. Tantillo, T.J., [1981, 11p.] CR 81-03 Tests of frazil collector lines to assist ice cover formation.	Solution of two-dimensional freezing and thawing problems O'Neill, K., [1983, p.653-658] MP 1584
Symposium on fire in the northern environment. Slaughter, C.W., ed, [1971, 275p.] MP 878	Perham, R.E., [1981, p.442-448] MP 1488	Approximate phase change solutions for insulated buried cyl
Forest land	Field investigations of a hanging ice dam. Beltace, S., et al.	inders. Lunardini, V.J., [1983, p.25-32] MIP 1593
Energy belance and runoff from a subarctic snowpack.	[1982, p.475-488] MP 1533 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.]	Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] MP 1891
Price, A.G., et al, [1976, 29p.] CR 76-27 Symposium on land treatment of wastewater, CRREL, Aug.	SR 82-09	Freezing and thawing: heat balance integral approximations
1978. [1978, 2 vois.] MP 1145	Physical and structural characteristics of antarctic sea ice.	Lunardini, V.J., [1983, p.30-37] MP 159
Perest solls	Gow, A.J., et al, [1982, p.113-117] MP 1548 Properties of sea ice in the coastal zones of the polar oceans.	Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] CR 83-12
Upland forest and its soils and litters in interior Alaska. Troth, J.L., et al, [1976, p.33-44] MP 867	Weeks, W.F., et al, [1983, p.25-41] MP 1604	Field tests of a frost-heave model. Guymon, G.L., et al
Forest tundra	Frazil ice. Daly, S.F., [1983, p.218-223] MP 2078	[1983, p.409-414] MP 165
Climatic and dendroclimatic indices in the discontinuous per-	Physical mechanism for establishing algal populations in frazil ice. Garrison, D.L., et al, [1983, p.363-365]	Comparison of two-dimensional domain and boundary integral geothermal models with embankment freeze-thaw field
mafrost zone of the Central Alaskan Uplands. Haugen, R.K., et al, (1978, p.392-398) MP 1099	MP 1717	data. Hromadka, T.V., II, et al, [1983, p.509-513]
Crude oil spills on black spruce forest. Jenkins, T.F., et al,	Relative abundance of diatoms in Weddell Sea pack ice. Clarke, D.B., et al, [1983, p.181-182] MP 1786	MP 1659 Fixed mesh finite element solution for cartesian two-dimen
[1978, p.305-323] MP 1185	Clarke, D.B., et al, [1983, p.181-182] MP 1786 Sea ice and biological activity in the Antarctic. Clarke, D.B.,	sional phase change. O'Neill, K., [1983, p.436-441]
Portifications Defensive works of subarctic snow. Johnson, P.R., [1977,	et al, [1984, p.2087-2095] MP 1701	MP 1702
	Frazil ice dynamics. Daly, S.F., [1984, 46p.] M 84-01	Simple model of ice segregation using an analytic function to model heat and soil-water flow. Hromadka, T.V., II, et al
Test of snow fortifications. Farrell, D.R., [1979, 15p.] SR 79-33	Performance of the Allegheny River ice control structure, 1983. Deck, D.S., et al, [1984, 15p.] SR 84-13	(1984, p.99-104) MP 2104
Snow fortifications as protection against shaped charge an-	Dynamics of frazil ice formation. Daly, S.F., et al, [1984,	Design implications of subsoil thawing. Johnson, T.C., et al [1984, p.45-103] MP 1700
titsnk projectiles. Farrell, D.R., [1980, 19p.] SR 80-11	p.161-172 ₁ MP 1829 Rise pattern and velocity of frazil ice. Wuebben, J.L.,	Accumulation, characterization, and stabilization of aludge
Foundations	[1984, p.297-316] MP 1816	for cold regions lagoons. Schneiter, R.W., et al, [1984, 40p.] SR 84-04
Piles in permafrost for bridge foundations. Crory, F.E., et al,	Modeling intake performance under frazil ice conditions.	Conductive backfill for improving electrical grounding is
[1967, 41p.] MP 1411 Field performance of a subarctic utilidor. Reed, S.C.,	Dean, A.M., Jr., [1984, p.559-563] MP 1797 Frazil ice formation. Ettema, R., et al, [1984, 44p.]	frozen soils. Sellmann, P.V., et al, [1984, 19p.] SR 84-17
[1977, p.448-468] MP 930	CR 84-18	Design and performance of water-retaining embankments in
Baseplate design and performance: mortar stability report.	USACRREL precise thermistor meter. Trachier, G.M., et al, [1985, 34p.] SR 85-26	permafrost. Sayles, F.H., (1984, p.31-42) MP 1850
Aitken, G.W., (1977, 28p.) CR 77-22 Kotzebue hospital—a case study. Crory, F.E., (1978,	Structure to form an ice cover on river rapids in winter. Per-	New classification system for the seasonal snow cover. Colbeck, S.C., [1984, p.179-181] MP 1921
p.342-359j MP 1084	ham, R.E., [1986, p.439-450] MP 2128	Salt action on concrete. Sayward, J.M., [1984, 69p.]
Details behind a typical Alaskan pile foundation. Tobiasson, W., et al, [1978, p.891-897] MP 1109	Frazil ice measurements in CRREL's flume facility. Daly, S.F., et al, (1986, p.427-438) MP 2127	SR 94-25
W., et al, [1978, p.891-897] MP 1109 Construction on permafrost at Longyearbyen on Spitsbergen.	Frazil ice pebbles, Tanana River, Alaska. Chacho, E.F., et	Radar investigations above the trans-Alaska pipeline near Fairbanks. Arcone, S.A., et al, [1984, 15p.]
Tobiasson, W., [1978, p.884-890] MP 1108	al, [1986, p.475-483] MP 2130	CR 84-27
Snow studies associated with the sideways move of DYE-3. Tobiasson, W., (1979, p.117-124) MP 1312	Sub-ice channels and frazil bars, Tanana River, Alaska. Lawson, D.E., et al., (1986, p.465-474) MP 2129	Automated soils freezing test. Chamberlain, E.J., [1985, 5p.] MP 1897
Bending and buckling of a wedge on an elastic foundation.	Freeze drying	
Nevel, D.E., [1980, p.278-288] MP 1303	Isothermal compressibility of water mixed with montmorillo- nite. Oliphant, J.L., et al, [1983, p.45-50] MP 2066	Potential use of artificial ground freezing for contaminant immobilization. Iskandar, I.K., et al, [1985, 10p.] MP 2025
Use of piling in frozen ground. Crory, F.E., [1980, 21 p.] MP 1407	nite. Oliphant, J.L., et al, [1983, p.45-50] MP 2066 Explosives in soils and sediments. Cragin, J.H., et al, [1985,	Seasonal variations in pavement performance. Johnson
Construction of foundations in permafrost. Linell, K.A., et	11p. ₁ CR 85-15	T.C., [1985, c21p.] MIP 2076
al, (1980, 310p.) SR 80-34	Consolidating draded material by fracting and thereing	Hydraulic properties of selected soils. Ingersoll, J., et al [1985, p.26-35] MP 1925
Design of foundations in areas of significant frost penetration. Linell, K.A., et al, [1980, p.118-184] MP 1358	Consolidating dredged material by freezing and thawing. Chamberlain, E.J., [1977, 94p.] MP 978	Freeze thaw consolidation of sediments, Beaufort Sea, Alas-
Foundations of structures in polar waters. Chamberlain,	Effect of freeze-thaw cycles on resilient properties of fine-	ka. Lee, H.J., et al, [1985, 83p.] MP 2025
E.J., [1981, 16p.] SR 81-25 Foundations on permafrost, US and USSR design and prac-	grained soils. Johnson, T.C., et al, [1978, 19p.] MP 1062	Model of freezing front movement. Hromadka, T.V., II, et al., [1985, 9p.] MP 2077
tice. Fish, A.M., [1983, p.3-24] MP 1682	Freeze thaw effect on the permeability and structure of soils.	Survey of airport pavement austress in cold regions. Vinson
Foundations in permafrost and seasonal frost; Proceedings.	Chamberlain, B.J., et al, (1978, p.31-44) MP 1080	T.S., et al, (1986, p.41-50) MIP 2002
[1985, 62p.] MP 1730 Frost jacking forces on H and pipe piles embedded in Fair-	Load tests on membrane-enveloped road sections. Smith, N., et al, [1978, 16p.] CR 78-12	Lessons learned from examination of membrane roofs in Alas- ka. Tobiasson, W., et al, [1986, p.277-290]
banks silt. Johnson, J.B., et al, [1985, p.125-133]	Resiliency of silt under asphalt during freezing and thawing.	MP 2003
MP 1930 Heat transfer characteristics of thermosyphons with inclined	Johnson, T.C., et al, (1978, p.662-668) MP 1106	Preeze thaw tests
evaporator sections. Haynes, F.D., et al., [1986, p.285-	Densification by freezing and thawing of fine material dredged from waterways. Chamberlain, E.J., et al., (1978,	Melting and freezing of a drill hole through the Antarctic shell ice. Tien, C., et al., (1975, p.421-432) MP 861
292 ₁ MP 2034	p.622-628 ₁ MP 1103	Remote-reading tensiometer for use in subfreezing tempera-
Investigation of ice forces on vertical structures. Hirayama,	Waterproofing strain gages for low ambient temperatures. Garfield, D.E., et al, [1978, 20p.] SR 78-15	tures. McKim, H.L., et al., (1976, p.31-45) MP 897
Investigation of ice forces on vertical structures. Hirayama, K., et al, [1974, 153p.] MP 1041	Overconsolidated sediments in the Beaufort Sea. Chamber-	Repetitive locding tests on membrane enveloped road sec- tions during freeze thaw. Smith, N., et al., [1977, p.171-
Practuring	lain, E.J., (1978, p.24-29) MP 1255	197 ₃ MP 962
Creep rupture at depth in a cold ice sheet. Colbeck, S.C., et al, (1978, p.733) MP 1168	Freeze thaw effect on resilient properties of fine soils. Johnson, T.C., et al, [1979, p.247-276] MP 1226	Preeze-thaw tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1977, 16p.]
Fracture behavior of ice in Charpy impact testing. Itagaki,	Freeze thaw effect on the permeability and structure of soils.	CR 77-24
K., et al, [1980, 13p.] CR 80-13	Chamberlain, E.J., et al. (1979, p.73-92) MP 1225 Stratified debris in Antarctic ice cores. Close A L et al.	Effects of moisture and freeze-thaw on rigid thermal insula- tions. Kaplar, C.W., (1978, p.403-417) MP 1065
Investigation of the acoustic emission and deformation re- sponse of finite ice plates. Xirouchakis, P.C., et al. 1981,	Stratified debris in Antarctic ice cores. Gow, A.J., et al, [1979, p.185-192] MP 1272	Preeze thaw loading tests on membrane enveloped road sec
19p.j CR 81-06	Sulfur foam as insulation for expedient roads. Smith, N., et	tions. Smith, N., et al. [1978, p.1277-1288]
Acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al, [1981, p.385-394]	al, (1979, 21p.) CR 79-18 Design of foundations in areas of significant frost penetration.	MP 1150 Overconsolidation effects of ground freezing. Chamberlain
MP 1455	Linell, K.A., et al, (1980, p.118-184) MP 1358	E.J., [1980, p.325-337] MP 1452
Acoustic emission and deformation of ice plates. Xiroucha- kis, P.C., et al, [1982, p.129-139] MP 1589	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al. (1981, p.76-81) MP 1494	Neumann solution applied to soil systems. Lunardini, V.J.

Simulating frost action by using an instrumented soil column. Ingersoil, J., et al, [1981, p.34-42] MP 1485	Thermal and load-associated distress in pavements. Johnson, T.C., et al, [1978, p.403-437] MP 1209	Hydraulic properties of selected soils. Ingersoll, J., et al, [1985, p.26-35] MP 1925
Comparative evaluation of frost-susceptibility tests. Cham-	Full-depth pavement considerations in seasonal frost areas.	Experimental study on factors affecting water migration in
berlain, E.J., (1981, p.42-52) MP 1486 Phase change around insulated buried pipes: quasi-steady	Eaton, R.A., et al, [1979, 24p.] MP 1188 Small-scale testing of soils for frost action. Sayward, J.M.,	frozen morin clay. Xu, X., et al, [1985, p.123-128] MIP 1897
method. Lunardini, V.J., [1981, p.201-207]	[1979, p.223-231] MP 1309	Ion and moisture migration and frost heave in freezing Morin
MP 1496	Soil tests for frost action and water migration. Sayward, J.M., [1979, 17 p.] SR 79-17	clay. Qiu, G., et al, [1986, p.1014] MP 1976 Frest mounds
Seasonal regime and hydrological significance of stream ic-	Mathematical model to correlate frost heave of pavements.	Ice-cored mounds at Sukakpak Mountain, Brooks Range.
ings in central Alaska. Kane, D.L., et al, ¿1973, p.528- 540 ₁ MP 1026	Berg, R.L., et al, [1980, 49p.] CR 80-10 Frost heave in an instrumented soil column. Berg, R.L., et	Brown, J., et al, (1983, p.91-96) MP 1633 Frost penetration
Ice formation and breakup on Lake Champlain. Bates, R.E.,	al, [1980, p.211-221] MP 1331	influence of insulation upon frost penetration beneath pave-
[1980, p.125-143] MP 1429 Ottauquechee River—analysis of freeze-up processes. Cal-	Adsorption force theory of frost heaving. Takagi, S., [1980, p.57-81] MP 1334	ments. Eaton, R.A., et al. (1976, 41p.) SR 76-06
kins, D.J., et al, [1982, p.2-37] MP 1738	Summary of the adsorption force theory of frost heaving.	Mathematical model to predict frost heave. Berg, R.L., et al, (1977, p.92-109) MP 1131
St. Lawrence River freeze-up forecast. Shen, H.T., et al, [1984, p.177-190] MP 1713	Takagi, S., 1980, p.233-2361 MP 1332 Frost heave model based upon heat and water flux. Guy-	Prost action in New Jersey highways. Berg, R.L., et al, [1978, 80p.] SR 78-09
Forecasting water temperature decline and freeze-up in rivers. Shen. H.T., et al. (1984, 17p.) CR 84-19	mon, G.L., et al, [1980, p.253-262] MIP 1333	Design of airfield pavements for seasonal frost and permafrost
Shen, H.T., et al, _[1984, 17p.] CR 84-19 Ice jam research needs. Gerard, R., _[1984, p.181-193]	Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669]	conditions. Berg, R.L., et al. (1978, 18p.) MP 1189
MP 1813	MP 1454	Pull-depth pavement considerations in seasonal frost areas. Eaton, R.A., et al, [1979, 24p.] MP 1188
Numerical simulation of freeze-up on the Ottauquechee River. Calkins, D.J., [1984, p.247-277] MP 1815	Construction of foundations in permafrost. Linell, K.A., et al, [1980, 310p.] SR 80-34	Drainage and frost action criteria for a pavement design. Berg, R.L., [1979, 51p.] SR 79-15
Instrumentation for an uplifting ice force model. Zabilansky, L.J., r1985, p.1430-1435; MP 2091	Results from a mathematical model of frost heave. Guymon,	Determination of frost penetration by soil resistivity measure-
L.J., [1985, p.1430-1435] MP 2091 St. Lawrence River freeze-up forecast. Foltyn, E.P., et al,	G.L., et al, [1981, p.2-6] MP 1483 Comparative evaluation of frost-susceptibility tests. Cham-	ments. Atkins, R.T., (1979, 24p.) SR 79-22
[1986, p.467-481] MP 2120	berlain, E.J., [1981, p.42-52] MP 1486	Mathematical model to correlate frost heave of pavements. Berg, R.L., et al, [1980, 49p.] CR 86-10
Freezing Heat and mass transfer from freely falling drops at low tem-	Ice segregation in a frozen soil column. Guymon, G.L., et al, [1981, p.127-140] MP 1534	Construction of an embankment with frozen soil. Botz, J.J., et al, [1980, 105p.] SR 88-21
peratures. Zarling, J.P., [1980, 14p.] CR 80-18	CRREL frost heave test, USA. Chamberlain, E.J., et al,	Frost heave in an instrumented soil column. Berg, R.L., et
Synoptic meteorology during the SNOW-ONE-A Field Experiment. Bilello, M.A., [1983, 80p.] SR 83-10	[1981, p.55-62] MP 1499 Frost susceptibility of soil; review of index tests. Chamber-	al, [1980, p.211-221] MIP 1331
Modeling two-dimensional freezing. Albert, M.R., [1984, 45p.]	lain, E.J., [1981, 110p.] M \$1-02	Construction of foundations in permafrost. Linell, K.A., et al, (1980, 310p.; SR 80-34
45p. ₁ CR 84-10 Technique for observing freezing fronts. Colbeck, S.C.,	Numerical solutions for a rigid-ice model of secondary frost heave. O'Neill, K., et al, [1982, 11p.] CR 82-13	Field studies of membrane encapsulated soil layers with additives. Eaton, R.A., et al., r1980, 46p.; SR 88-33
(1985, p.13-20) MP 1861	Relationship between the ice and unfrozen water phases in	tives. Eaton, R.A., et al, [1980, 46p.] SR 88-33 Laboratory and field use of soil tensiometers above and below
Prevention of freezing of wastewater treatment facilities. Reed, S.C., et al. (1985, 49p.) SR 85-11	frozen soil. Tice, A.R., et al, [1982, 8p.] CR 82-15	0 deg C. Ingersoll, J., [1981, 17p.] SR 81-07
Procesing indexes	Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] MP 1596	Full-depth and granular base course design for frost areas. Eaton, R.A., et al, [1983, p.27-39] MP 1492
Drainage and frost action criteria for a pavement design. Berg, R.L., (1979, 51p.) SR 79-15	Frost heave model. Hromadka, T.V., II, et al, [1982, p.1-10] MP 1567	Field tests of a frost-heave model. Guymon, G.L., et al,
Preezing nuclei	10 ₁ MP 1567 Prost susceptibility of soil; review of index tests. Chamber-	[1983, p.409-414] MP 1657 Comparison of two-dimensional domain and boundary inte-
Studies of high-speed rotor icing under natural conditions. Itagaki, K., et al, [1983, p.117-123] MP 1635	lain, E.J., [1982, 110p.] MP 1557	gral geothermal models with embankment freeze-thaw field
Preezing points	Full-depth and granular base course design for frost areas. Eaton, R.A., et al, (1983, p.27-39) MP 1492	data. Hromadka, T.V., II, et al, [1983, p.509-513] MP 1659
Bottom heat transfer to water bodies in winter. O'Neill, K., et al, [1981, 8p.] SR 81-18	Physics of mathematical frost heave models: a review.	Designing for frost heave conditions. Crory, F.E., et al., [1984, p.22-44] MIP 1705
Priction	O'Neill, K., [1983, p.275-291] MP 1588 Field tests of a frost-heave model. Guymon, G.L., et al,	Evaluating trafficability. McKim, H.L., (1985, p.474-475)
Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben. Andreas, E.L., et al. (1983, p.779-782)	(1983, p.409-414) MP 1657	MP 2023
MP 1577	Frost heave of saline soils. Chamberlain, E.J., [1983, p.121- 126] MP 1655	Frost protection Evaluation of MESL membrane—puncture, stiffness, temper-
Constitutive relations for a planar, simple shear flow of rough disks. Shen, H.H., et al, [1985, 17p.] CR 85-20	Frozen soil-water diffusivity under isothermal conditions.	ature, solvents. Sayward, J.M., [1976, 60p.]
Prost action	Nakano, Y., et al, [1983, 8p.] CR 83-22 Revised procedure for pavement design under seasonal frost	Utility distribution practices in northern Europe. McFad-
Frost action in New Jersey highways. Berg, R.L., et al, (1978, 80p.) SR 78-09	conditions. Berg, R., et al, [1983, 129p.] SR 83-27	den, T., et al, [1977, p.70-95] MP 928 Construction and performance of membrane encapsulated
Small-scale testing of soils for frost action. Sayward, J.M., [1979, p.223-231] MP 1309	Two-dimensional model of coupled heat and moisture trans- port in frost heaving soils. Guymon, G.L., et al, 1984,	soil layers in Alaska. Smith, N., [1979, 27p.]
[1979, p.223-231] MP 1309 Soil tests for frost action and water migration. Sayward,	p.91-98 ₁ MP 1678	CR 79-16 Revised procedure for pavement design under seasonal frost
J.M., _{{1} 979, 17 p. ₃ SR 79-17 Construction of foundations in permafrost. Linell, K.A., et	Simple model of ice segregation using an analytic function to model heat and soil-water flow. Hromadka, T.V., II, et al,	conditions. Berg, R., et al, [1983, 129p.] SR 83-27
al, [1980, 310p.] SR 80-34	[1984, p.99-104] MP 2104 Offshore mechanics and Arctic engineering symposium,	Fruit resistance Full-depth pavement considerations in seasonal frost areas.
Pothole primer; a public administrator's guide to understand- ing and managing the pothole problem. Eaton, R.A.,	1984. [1984, 3 vols.] MP 1675	Eaton, R.A., et al, (1979, 24p.) MP 1188
coord, [1981, 24p.] MP 1416	Survey of methods for classifying frost susceptibility. Chamberlain, E.J., et al, 1984, p.104-141, MP 1707	Field studies of membrane encapsulated soil layers with additives. Baton, R.A., et al, (1980, 46p.) SR 88-33
Simulating frost action by using an instrumented soil column. Ingersoil, J., et al, [1981, p.34-42] MP 1485	Designing for frost heave conditions. Crory, F.E., et al,	Comparative evaluation of frost-susceptibility tests. Cham-
Computer models for two-dimensional steady-state heat con-	[1984, p.22-44] MP 1705	berlain, E.J., [1981, p.42-52] MP 1486 CRREL frost heave test, USA. Chamberlain, E.J., et al,
duction. Albert, M.R., et al, [1983, 90p.] CR 83-10 Revised procedure for pavement design under seasonal frost	Prost action and its control. Berg, R.L., ed, [1984, 145p.] MP 1704	(1981, p.55-62) MP 1499
conditions. Berg, R., et al, [1983, 129p.] SR 83-27	Role of heat and water transport in frost heaving of porous soils. Nakano, Y., et al, 1984, p.93-102, MP 1842	Frost action and its control. Berg, R.L., ed, [1984, 145p.] MP 1704
Frost action and its control. Berg, R.L., ed, [1984, 145p.] MP 1704	Ice segregation and frost heaving. [1984, 72p.]	Survey of methods for classifying frost susceptibility. Cham-
Deteriorated building panels at Sondrestrom, Greenland. Korhonen, C., 1985, p.7-10, MP 2017	MP 1809 Status of numerical models for heat and mass transfer in frost-	berlain, B.J., et al, [1984, p.104-141] MP 1797 Status of numerical models for heat and mass transfer in frost-
Korhonen, C., [1985, p.7-10] MP 2017 Vertically stable benchmarks: a synthesis of existing informa-	susceptible soils. Berg, R.L., [1984, p.67-71]	susceptible soils. Berg, R.L., [1984, p.67-71] MP 1851
tion. Gatto, L.W., [1985, p.179-188] MP 2069 Frost forecasting	MP 1851 Mitigative and remedial measures for chilled pipelines in dis-	Prozen fines
Relationships between January temperatures and the winter	continuous permafrost. Sayles, F.H., [1984, p.61-62]	Strength and deformation of frozen silt. Haynes, F.D., r1978, p.655-661; MP 1105
regime in Germany. Bilello, M.A., et al, [1979, p.17-27] MP 1218	MP 1974 Heat and moisture transfer in frost-heaving soils. Guymon,	Resiliency of silt under asphalt during freezing and thawing.
Frost heave	G.L., et al, [1984, p.336-343] MP 1765	Johnson, T.C., et al, [1978, p.662-668] MP 1106
Heat and moisture flow in freezing and thawing soils—a field study. Berg, R.L., [1975, p.148-160] MP 1612	Exploration of a rigid ice model of frost heave. O'Neill, K., et al, (1985, p.281-296) MP 1880	Permafrost excavating attachment for heavy buildozers.
Influence of insulation upon frost penetration beneath pave-	Automated soils freezing test. Chamberlain, E.J., 1985, 5p.1 MP 1892	Garfield, D.E., et al, [1977, p.144-151] MP 955 Design considerations for airfields in NPRA. Crory, F.E., et
ments. Eaton, R.A., et al. (1976, 41p.) SR 76-06 Galerkin finite element analog of frost heave. Guymon,	Frost heave forces on piling. Each, D.C., et al, (1985, 2p.)	Design considerations for airfields in NPRA. Crory, F.E., et al, [1978, p.441-458] MP 1066
G.L., et al, [1976, p.111-113] MIP 896	MP 1732	Prozes ground
Mathematical model to predict frost heave. Berg, R.L., et al., (1977, p.92-109) MP 1131	Soil freezing response: influence of test conditions. McCabe, E.Y., et al, [1985, p.49-58] MP 1990	Subsurface explorations in permafrost areas. Cass, J.R., Jr., [1959, p.31-41] MP 885
Segregation freezing as the cause of suction force for ice lens	Stefan problem in a finite domain. Takagi, S., [1985, 28p.]	Proposed size classification for the texture of frozen earth materials. McGaw, R., [1975, 10p.] MP 921
Segregation freezing as the cause of suction force for ice lens	Phase equilibrium in frost heave of fine-grained soil. Naka-	Stake driving tools: a preliminary survey. Kovacs, A., et al,
formation. Takagi, S., [1978, p.45-51] MP 1081	no, Y., et al, (1985, p.50-68) MP 1896 Frost heave of full-depth asphait concrete pavements. Zom-	(1977, 43p.) SR 77-13 Second progress report on oil spilled on permafrost. McFad-
Effects of subgrade preparation upon full depth pavement performance in cold regions. Eaton, R.A., [1978, p.459-	erman, I., et al, [1985, p.66-76] MP 1927	den, T., et al, [1977, 46p.] SR 77-44
473 ₁ MP 1087 Frost action in New Jersey highways. Berg, R.L., et al,	Frost jacking forces on H and pipe piles embedded in Fair- banks silt. Johnson, J.B., et al. [1985, p.125-133]	Determination of unfrozen water in frozen soil by pulsed nuclear magnetic resonance. Tice, A.R., et al, 1978,
[1978, 80p.] SR 78-09	MP 1930	p.149-155 ₁ MP 1097
Design of airfield pavements for sessonal frost and permafrost conditions. Berg, R.L., et al., [1978, 18p.] MP 1189	Partial verification of a thaw settlement model. Guymon, G.L., et al, (1985, p.18-25) MP 1924	Terminal ballistics in cold regions materials. Aitken, G.W., [1978, 6p.] MP 1182
· · · · · · · · · · · · · · · · · · ·		

French great (cost.)	Electrical resistivity of frozen ground. Arcone, S.A., [1979,	Design of foundations in areas of significant frost penetration.
Some aspects of Soviet trenching machines. Mellor, M., 1980, 13p.,	p.32-37; MF 1623	Linell, K.A., et al. [1980, p.118-184] MP 1358 Phase change around a circular pipe. Lunardini, V.J.,
[1980, 13p.] SR 88-07 Nose shape and L/D ration, and projectile penetration in	Determination of frost penetration by soil resistivity measurements. Atkins, R.T., [1979, 24p.] SE 79-22	rise change around a circum pape. Lumirum, v.s., [1980, 18p.] CR 89-27
frozen soil. Richmond, P.W., [1980, 21p.] SR 80-17	Electron microscope investigations of frozen and unfrozen	Alaska Good Friday earthquake of 1964. Swinzow, G.K.,
Watershed modeling in cold regions. Stokely, J.L., [1980, 241p.] MP 1471	bentonite. Kumai, M., (1979, 14p.) CE 79-28 Thermal diffusivity of frozen soil. Haynes, F.D., et al,	[1982, 26p.] CR 82-01 Acoustic emissions during creep of frozen soils. Fish, A.M.,
National Chinese Conference on Permafrost, 2nd, 1981.	[1980, 30p.] SR 96-38	et al, (1982, p.194-206) MP 1495
Brown, J., et al, [1982, 58p.] SR 82-03	VHP electrical properties of frozen ground near Point Barrow,	Testing shaped charges in unfrozen and frozen silt in Alaska.
Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al, [1982, 8p.] CR 82-15	Alaska. Arcone, S.A., et al., [1981, 18p.] CR 81-13 Phase change around a circular cylinder. Lunardini, V.J.,	Smith, N., [1982, 10p.] SR 82-02 Piling in frozen ground. Crory, F.B., [1982, p.112-124]
Effects of ice content on the transport of water in frozen soils.	[1981, p.598-600] MIP 1507	MIP 1722
Nakano, Y., et al, [1984, p.28-34] MP 1841	Heat conduction with phase changes. Lunardini, V.J., [1981, 14p.] CR 81-25	Initial stage of the formation of soil-laden ice lenses. Takagi,
Effects of ice content on the transport of water in frozen soil. Nakano, Y., et al, [1984, p.58-66] MP 1843	(1981, 14p.) CE 81-25 Acoustic emissions during creep of frozen soils. Fish, A.M.,	S., [1982, p.223-232] MP 1596 Comparison of unfrozen water contents measured by DSC
Conventional land mines in winter. Richmond, P.W.,	et al, [1982, p.194-206] MP 1495	and NMR. Oliphant, J.L., et al, [1982, p.115-121]
t 1984, 23p. SR 84-36 Transport of water in frozen soil. Nakano, Y., et al, t 1984,	Mobility of water in frozen soils. Lunardini, V.J., et al. [1982, c15p.] MIP 2912	MP 1594 Freezing of soil with surface convection. Lunardini, V.J.,
p.172-179j MIP 1819	Understanding the Arctic sea floor for engineering purposes.	[1982, p.205-212] MIP 1595
Unfrozen water content in frozen ground. Xu, X., et al, [1985, p.83-87] MP 1929	[1982, 141p.] SR 43-25	Deformation and failure of frozen soils and ice due to stresses. Fish, A.M., [1982, p.419-428] MP 1553
Frence ground chemistry	Electrical properties of frozen ground, Point Barrow, Alaska. Arcone, S.A., et al, 1982, p.485-492; MP 1572	Pish, A.M., (1982, p.419-428) MP 1553 Effect of loading on the unfrozen water content of silt. Oli-
Ionic migration and weathering in frozen Antarctic soils.	Transport of water in frozen soil, Part 1. Nakano, Y., et al,	phant, J.L., et al, [1983, 17p.] SR 83-18
Ugolini, F.C., et al, [1973, p.461-470] MP 941 Frescu ground compression	[1982, p.221-226] MP 1629 Physics of mathematical frost heave models: a review.	Creep behavior of frozen silt under constant uniaxial stress. Zhu, Y., et al, £1983, p.1507-1512; MIP 1865
Increasing the effectiveness of soil compaction at below-freez-	O'Neill, K., [1983, p.275-291] MP 1588	Brosion of perennially frozen streambanks. Lawson, D.E.,
ing temperatures. Hass, W.M., et al, (1978, 58p.) SR 78-25	Effects of ice on the water transport in frozen soil. Nakano,	[1983, 22p.] CR 83-29
Deformation and failure of frozen soils and ice due to stresses.	Y., et al. (1983, p.15-26) MP 1601 Relationship between ice and unfrozen water in frozen soils.	Compressive strength of frozen silt. Zhu, Y., et al, [1984, p.3-15] MP 1773
Fish, A.M., [1982, p.419-428] MP 1553	Tice, A.R., et al, [1983, p.37-46] MP 1632	Seasonal soil conditions and the reliability of the M15 land
Process ground mechanics	Water migration due to a temperature gradient in frozen soil.	mine. Richmond, P.W., et al, [1984, 35p.] SR 84-18
Heat and moisture flow in freezing and thawing soils—a field study. Berg, R.L., 1975, p.148-160; MP 1612	Oliphant, J.L., et al, [1983, p.951-956] MP 1666 Two-dimensional model of coupled heat and moisture trans-	Shear strength in the zone of freezing in saline soils. Chamberlain, E.J., [1985, p.566-574] MP 1879
Finite element model of transient heat conduction. Guy-	port in frost heaving soils. Guymon, G.L., et al, [1984,	Prozen ground physics. Fish, A.M., [1985, p.29-36]
mon, G.L., et al. [1977, 167p.] SR 77-38 Effect of freeze-thaw cycles on resilient properties of fine-	p.91-98 ₁ MP 1678 Offshore mechanics and Arctic engineering symposium,	MP 1928 Shear strength anisotropy in frozen saline and freshwater
grained soils. Johnson, T.C., et al, [1978, 19p.]	1984. [1984, 3 vols.] MP 1675	soils. Chamberlain, E.J., [1985, p.189-194]
MP 1082 Thermal and creep properties for frozen ground construction.	Field dielectric measurements of frozen silt using VHF pulses. Arcone, S.A., et al, [1984, p.29-37] MF 1774	MP 1931 Strain rate effect on the tensile strength of frozen silt. Zhu.
Sanger, F.J., et al. (1978, p.95-117) MP 1624	Dielectric measurements of frozen silt using time domain re-	Y., et al, [1985, p.153-157] MP 1896
Preeze thaw effect on resilient properties of fine soils. John-	flectometry. Delaney, A.J., et al, [1984, p.39-46] MP 1775	Repeated load triaxial testing of frozen and thawed soils.
son, T.C., et al, [1979, p.247-276] MP 1226 Thermal and creep properties for frozen ground construction.	Conductive backfill for improving electrical grounding in	Cole, D.M., et al, (1985, p.166-170) MIP 2068 Tensile strength of frozen silt. Zhu, Y., , (1986, p.15-28)
Sanger, P.J., et al, [1979, p.311-337] MP 1227	frozen soils. Sellmann, P.V., et al, [1984, 19p.]	MP 1971
Application of the Andrade equation to creep data for ice and frozen soil. Ting, J.M., et al, (1979, p.29-36)	SR 84-17 Pulse transmission through frozen silt. Arcone, S.A.,	Presen ground temperature
MP 1802	[1984, 9p.] CR 84-17	Siumping failure of an Alaskan earth dam. Collina, C.M., et al, [1977, 21p.] SR 77-21
Mechanical properties of frozen ground. Ladanyi, B., et al.	Effects of magnetic particles on the unfrozen water content in soils. Tice, A.R., et al., [1984, p.63-73] MP 1790	Freezing of soil with surface convection. Lunardini, V.J.,
[1979, p.7-18] MP 1726 Grouting silt and sand at low temperatures. Johnson, R.,	Snow, ice and frozen ground research at the Sleepers River,	(1982, p.205-212) MP 1595
(1979, p.937-950) MP 1078	VT. Pangburn, T., et al, [1984, p.229-240]	Relationship between ice and unfrozen water in frozen soils. Tice, A.R., et al, [1983, p.37-46] MP 1632
High-explosive cratering in frozen and unfrozen soils in Alaska. Smith, N., (1980, 21p.) CR 80-09	MP 2071 Coazial waveguide reflectometry for frozen ground and ice.	Relationships between estimated mean annual air and perma-
Dynamic testing of free field stress gages in frozen soil. Aitk-	Delaney, A.J., et al, (1984, p.428-431) MIP 2048	frost temperatures in North-Central Alaska. Haugen, R.K., et al, [1983, p.462-467] MIP 1658
en, G.W., et al, [1980, 26p.] SR 80-30 Overconsolidation effects of ground freezing. Chamberlain,	Deuterium diffusion in a soil-water-ice mixture. Oliphant, J.L., et al, [1984, 11p.] SR 84-27	Design implications of subsoil thawing. Johnson, T.C., et al.
E.J., [1980, p.325-337] MP 1452	Impulse radar sounding of frozen ground. Kovaca, A., et al,	[1984, p.45-103] MP 1796 Prototype drill for core sampling fine-grained perennially
Construction of foundations in permafrost. Linell, K.A., et	[1985, p.28-40] MP 1952 Water migration in frozen clay under linear temperature	frozen ground. Brockett, B.E., et al, [1985, 29p.]
al, [1980, 310p.] SR 80-34 Simulating frost action by using an instrumented soil column.	gradients. Xu, X., et al, [1985, p.111-122] MP 1934	CR 85-01 Frozen ground physics. Fish, A.M., [1985, p.29-36]
Ingersoll, J., et al. (1981, p.34-42) MP 1485	Biffects of soluble salts on the unfrozen water content in silt.	MP 1928
Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., r1981, 18p., SR 81-24	Tice, A.R., et al, [1985, p.99-109] MP 1933 Model for dielectric constants of frozen soils. Oliphant, J.L.,	Review of analytical methods for ground thermal regime cal-
Thermal properties of soils. Farouki, O.T., (1981, 136p.)	[1985, p.46-57] MP 1926	culations. Lunardini, V.J., [1985, p.204-257] MP 1922
M 81-01 Deformation and failure of frozen soils and ice due to stresses.	Frozen ground physics. Fish, A.M., (1985, p.29-36) MP 1928	Soil-water potential and unfrozen water content and tempera-
Fish, A.M., [1982, p.419-428] MP 1553	Experimental study on factors affecting water migration in	ture. Xu, X., et al, (1985, p.1-14) MP 1932 Frozen ground thermodynamics
Frozen soil characteristics that affect land mine functioning.	frozen morin clay. Xu, X., et al, [1985, p.123-128]	Segregation-freezing temperature as the cause of suction
Richmond, P.W., (1983, 18p.) SR 83-05 Creep behavior of frozen silt under constant uniaxial stress.	MP 1897 Frozen ground settling	force. Takagi, S., [1977, p.59-66] MP 901
Zhu, Y., et al, [1983, p.1507-1512] MP 1805	Overconsolidation effects of ground freezing. Chamberlain,	Segregation freezing as the cause of suction force for ice lens formation. Takagi, S., [1978, p.45-51] MP 1001
Frozen soil-water diffusivity under isothermal conditions. Nakano, Y., et al, [1983, 8p.] CR 83-22	E.J., [1980, p.325-337] MP 1452 Comparative analysis of the USSR construction codes and the	Thermal and creep properties for frozen ground construction.
Thermodynamic model of soil creep at constant stresses and	US Army technical manual for design of foundations on	Sanger, F.J., et al. (1978, p.95-117) MP 1624 Thermal and creep properties for frozen ground construction.
strains. Flah, A.M., [1983, 18p.] CR 83-33	permafrost. Fish, A.M., [1982, 20p.] CR 82-14 Frozen ground strength	Sanger, F.J., et al., [1979, p.311-337] MP 1227
Creep behavior of frozen silt under constant uniaxial stress. Zhu, Y., et al, [1984, p.33-48] MP 1807	Excavating rock, ice, and frozen ground by electromagnetic	Introduction to the basic thermodynamics of cold capillary systems. Colbeck, S.C., [1981, 9p.] SR 81-96
Modeling the resilient behavior of frozen soils using unfrozen	radiation. Hoekstra, P., [1976, 17p.] CR 76-36	Thermal properties of soils. Farouki, O.T., (1981, 136p.)
water content. Cole, D.M., [1984, p.823-834] MP 1715	Effect of temperature on the strength of frozen silt. Haynes, F.D., et al, [1977, 27p.] CR 77-03	M #1-01
Thermodynamic model of creep at constant stress and con-	Permafrost excavating attachment for heavy buildozers.	Thermodynamic model of soil creep at constant stresses and strains. Fish, A.M., [1983, 18p.] CR 83-33
stant strain rate. Fish, A.M., (1984, p.143-161) MP 1771	Garfield, D.E., et al, (1977, p.144-151; MP 955 Ground pressures exerted by underground explosions. John-	Promos lakes
Tertisry creep model for frozen sands (discussion). Fish,	son, P.R., [1978, p.284-290] MIP 1520	Imaging radar observations of frozen Arctic lakes. Elachi, C., et al, 1976, p.169-175; MP 1284
A.M., et al., (1984, p.1373-1378; MP 1810 Foundations in permafrost and seasonal frost; Proceedings.	Mechanical properties of frozen ground. Ladanyi, B., et al, [1979, p.7-18] MP 1726	Prosen rock temperature
[1985, 62p.] MP 1730	Construction of an embankment with frozen soil. Botz, J.J.,	Engineering properties of submarine permafrost near Prudhoe
Sessonal variations in pavement performance. Johnson, T.C., [1985, c21p.] MP 2076	et al, [1980, 105p.) SR 96-21	Bay. Chamberlain, E.J., et al, 1978, p.629-635, MP 1104
T.C., (1985, c21p.) MP 2076 Freeen ground physics	Use of piling in frozen ground. Crory, F.E., [1980, 21 p.] MIP 1407	Proces sand
Evaluation of methods for calculating soil thermal conductivi-	Small caliber projectile penetration in frozen soil. Rich-	Design considerations for airfields in NPRA. Crory, F.B., et al, [1978, p.441-458] MP 1006
ty. Parouki, O., [1972, 90p.] CR 82-66 Applications of thermal analysis to cold regions. Sterrett,	mond, P.W., [1980, p.801-823] MP 1496 Overconsolidation effects of ground freezing. Chamberlain,	Paul transport
K.F., (1976, p.167-181) MP 890	E.J., [1980, p.325-337] MP 1452	Effects of ice on coal movement via the inland waterways.
Calculating unfrozen water content of frozen soils. McGaw, R., et al, [1976, p.114-122] MP 899	Kinetic nature of the long term strength of frozen soils. Fish, A.M., (1980, p.95-108) MP 1450	Lunardini, V.J., et al, [1981, 72p.] SR 81-13
Computer program for determining electrical resistance in	Strength of frozen silt as a function of ice content and dry unit	Low temperature automotive emissions. Coutts, H.J.,
nonhomogeneous ground. Arcone, S.A., [1977, 16p.] CR 77-02	weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451	[1983, 2 vols.] MP 1703 Gas chromatography
NMR phase composition measurements on moist soils.	Excavation of frozen materials. Moore, H.B., et al, (1980,	Vapor pressure of TNT by gas chromatography. Leasett,
Tice, A.R., et al, [1978, p.11-14] MP 1210	p.323-345 ₁ MP 1360	D.C., [1977, p.83-90] MP 915

Gas inclusions	Pebble fabric in an ice-rafted diamicton. Domack, E.W., et	1979 Greenland Ice Sheet Program. Phase 1: casing opera-
	al, (1985, p.577-591) MP 1959	tion. Rand, J.H., (1980, 18p.) SR 80-24
Continuous monitoring of total dissolved gases, a feasibility study. Jenkins, T.F., [1975, p.101-105] MP 851	Glacial features	Cold Regions Science and Technology Bibliography. Cum-
Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al,	Influence of irregularities of the bed of an ice sheet on deposi-	mings, N.H., [1981, p.73-75] MP 1372
[1975, p.5101-5108] MP 847 Viking GCMS analysis of water in the Martian regolith.	tion rate of till. Nobles, L.H., et al, [1971, p.117-126] MP 1609	Deposits in the glacial environment. Lawson, D.E., [1981, 16p.] CR 81-27
Anderson, D.M., et al, (1978, p.55-61) MP 1195	Glacial goology	Bibliography on glaciers and permafrost, China, 1938-1979.
Equations for determining the gas and brine volumes in sea	Sediments of the western Matanuska Glacier. Lawson, D.E.,	Shen, J., ed, [1982, 44p.] SR 82-20
foe samples. Cox, G.F.N., et al, [1982, 11p.]	(1979, 112p.) CR 79-09	Proceedings of the Symposium on Applied Glaciology, 2nd, 1982. [1983, 314p.] MP 2054
Mathematical simulation of nitrogen interactions in soils.	Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al, [1985, p.105-110] MIP 1941	Grain also
Solim, H.M., et al, [1983, p.241-248] MP 2051	Glacial hydrology	Antarctic soil studies using a scanning electron microscope.
Roustions for determining gas and brine volumes in sea ice.	Short-term forecasting of water run-off from snow and ice.	Kumai, M., et al, [1978, p.106-112] MP 1386
Cox, G.F.N., et al, (1983, p.306-316) MP 2055	Colbeck, S.C., [1977, p.571-588] MP 1067 Glacial rivers	Grain clusters in wet snow. Colbeck, S.C., [1979, p.371-384] MIP 1267
Trace gas analysis of Arctic and subarctic atmosphere.	Direct filtration of streamborne glacial silt. Ross, M.D., et	Influence of grain size on the ductility of ice. Cole, D.M.,
Murrmann, R.P., (1971, p.199-203) MP 906	al, [1982, 17p.] CR 82-23	[1984, p.150-157 _] MP 1686
Mercury contamination of water samples. Cragin, J.H.,	Clacial 411	Grain size and the compressive strength of ice. Cole, D.M.,
[1979, p.313-319] NCP 1270 Gosbotanical interpretation	Influence of irregularities of the bed of an ice sheet on deposi- tion rate of till. Nobles, L.H., et al, [1971, p.117-126]	[1985, p.220-226] MP 1858 Grain size and the compressive strength of ice. Cole, D.M.,
Geobotanical studies on the Taku Giacier anomaly. Heuse-	MP 1009	[1985, p.369-374] MP 1907
er, C.J., et al, [1954, p.224-239] MP 1215	Sediments of the western Matanuska Glacier. Lawson, D.E.,	Grasses
Bavironmental mapping of the Arctic National Wildlife Ref- uge, Alaska. Walker, D.A., et al, 1982, 59p. + 2 maps	[1979, 112p.] CR 79-09 Glacier ablation	Urban waste as a source of heavy metals in land treatment. Iskandar, I.K., r1976, p.417-432; MP 977
CR \$2-37	Influence of irregularities of the bed of an ice sheet on deposi-	lakandar, I.K., [1976, p.417-432] MP 977 Effects of wastewater application on forage grasses. Palazzo,
Geodetic surveys	tion rate of till. Nobles, L.H., et al, [1971, p.117-126]	A.J., [1976, 8p.] CR 76-39
Geodetic positions of borehole sites in Greenland. Mock,	MP 1669 Subserial sediment flow of the Matanuska Giscier, Alaska.	Effects of wastewater on the growth and chemical composi-
S.J., _[1976, 7p.] CR 76-41 Geologic structures	Lawson, D.B., (1982, p.279-300) MP 1806	tion of forages. Palazzo, A.J., [1977, p.171-180] MIP 975
Investigation of an airborne resistivity survey conducted at	Glacier bode	Adaptability of forage grasses to wastewater irrigation.
very low frequency. Arcone, S.A., r1977, 48p.,	Geophysics of subglacial geology at Dye 3, Greenland.	Palazzo, A.J., et al., [1978, p.157-163] MP 1153
CR 77-29 Remote sensing for reconnaissance of proposed construction	Jezek, K.C., et al. [1985, p.105-110] MIP 1941 Glacier flow	Effects of wastewater and sludge on turfgrasses. Palazzo, A.J., 1978, 11p.; SR 78-20
alte. McKim, H.L., et al., [1978, 9 leaves] MP 1167	Geobotanical studies on the Taku Glacier anomaly. Heuss-	Land application of wastewater: effect on soil and plant potas-
Proceedings of the second planetary water and polar pro-	er, C.J., et al, [1954, p.224-239] MIP 1215	sium. Palazzo, A.J., et al, [1979, p.309-312]
cesses colloquium, 1978. [1978, 209p.] MIP 1193	Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522	MP 1228
Remote sensing for earth dam site selection and construction materials. Merry, C.J., et al, [1980, p.158-170]	Influence of irregularities of the bed of an ice sheet on deposi-	Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] CR 80-03
MP 1316	tion rate of till. Nobles, L.H., et al, (1971, p.117-126)	Forage grass growth on overland flow systems. Palazzo,
Goology	MP 1009	A.J., et al, [1980, p.347-354] MP 1402
Bedrock seology survey in northern Maine. Sellmann, P.V., et al, [1976, 19p.] CR 76-37	Small-scale strain measurements on a glacier surface. Col- beck, S.C., et al, [1971, p.237-243] MP 993	Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al, [1981, 8p.] SR \$1-04
Geometricology	Isua, Greenland: glacier freezing study. Ashton, G.D.,	Seasonal growth and uptake of nutrients by orchardgrass irri-
Morphology of the North Slope. Walker, H.J., (1973, p.49-	[1978, p.256-264] MIP 1174	gated with wastewater. Palazzo, A.J., et al, [1981, 19p.]
52 ₃ MP 1004	Ultrasonic investigation on ice cores from Antarctica. Kohnen, H., et al, [1979, 16p.] CR 79-10	CR 81-08 Revegetation along the trans-Alacka pipeline, 1975-1978.
Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] CR 80-14	Glacier mechanics. Mellor, M., [1982, p.455-474]	Johnson, A.J., [1981, 115p.] CR 81-12
Tundra and analogous soils. Everett, K.R., et al, [1981,	MP 1532	Chena River Lakes Project revegetation study-three-year
p.139-179 ₃ MP 1485	Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., (1985, p.242-251; MP 1817	summary. Johnson, L.A., et al, [1981, 59p.] CR 81-18
Sediment load and channel characteristics in subarctic upland	anous. Jesse, A.C., (1707, p.242-251) ner 1917	CT 41-14
catchments Slaughter C.W. et al. (1981 n 39-48)	Glacier ice	Wastewater treatment and plant growth. Palazzo, A.J.,
catchments. Slaughter, C.W., et al, [1981, p.39-48] MP 1518	Glacier ice Influence of irregularities of the bed of an ice sheet on deposi-	Wastewater treatment and plant growth. Palazzo, A.J., 1982, 21p.; SR 82-85
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 Ice-cored mounds at Sukakpak Mountain, Brooks Range.	Influence of irregularities of the bed of an ice sheet on deposi- tion rate of till. Nobles, L.H., et al, t1971, p.117-126;	[1982, 21p.] SR 82-05 Effects of inundation on six varieties of turfgrass. Erbisch,
catchments. Slaughter, C.W., et al. (1981, p.39-48) MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. (1983, p.91-96) MP 1653	Influence of irregularities of the bed of an ice sheet on deposi- tion rate of till. Nobles, L.H., et al, (1971, p.117-126) MP 1669	r1982, 21p.; SR 82-05 Effects of inundation on six varieties of turfgrass. F.H., et al, r1982, 25p.; SR 82-12
catchments. Slaughter, C.W., et al. (1981, p.39-48) MP 1518 Ico-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. (1983, p.91-96) MP 1653 Periglacial landforms and processes, Kenai Mts., Alsaka.	Influence of irregularities of the bed of an ice sheet on deposi- tion rate of till. Nobles, L.H., et al, t1971, p.117-126;	r1982, 21p.] SR 82-65 Effects of inundation on six varieties of turfgrass. F.H., et al, [1982, 25p.] Gravel
catchments. Slaughter, C.W., et al. (1981, p.39-48) MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. (1983, p.91-96) MP 1633 Periglacial landforms and processes, Kensi Mts., Alaska. Bailey, P.K., (1985, 60p.) SR 85-63 Geophysical surveys	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., t1971, p.117-126, MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., t1972, p.D76-D92; Depth of water-filled crevasses that are closely spaced. Rob-	r1982, 21p.] SR 82-65 Effects of inundation on six varieties of turfgrass. F.H., et al, [1982, 25p.] Gravel
catchments. Slaughter, C.W., et al., [1981, p.39-48]. MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96]. MP 1653 Perigiacal landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical methods for hydrological investigations in per-	Influence of irregularities of the bed of an ice sheet on deposi- tion rate of till. Nobles, L.H., et al, t1971, p.117-126; MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al, t1972, p.D70-D92; MP 1652 Depth of water-filled crevasses that are closely spaced. Robein, G. de Q., et al, t1974, p.543-544; MP 1638	r[1982, 21p.] SR 82-85 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01
catchments. Slaughter, C.W., et al. (1981, p.39-48) MP 1518 Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. (1983, p.91-96) MP 1653 Periglacial isndforms and processes, Kenai Mts., Aleska, Bailey, P.K., (1985, 60p.) Geophysical surveys Geophysical surveys Geophysical methods for hydrological investigations in per- maffort regions. Hoekstra, P., (1976, p.75-90)	Influence of irregularities of the bed of an ice aheet on deposition rate of till. Nobles, L.H., et al, t1971, p.117-126; MIP 1699 C-14 and other isotope studies on natural ice. Oceahger, H., et al, t1972, p.D70-D92; MIP 1652 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al, t1974, p.543-544; MIP 1038 Changes in the composition of atmospheric precipitation.	r1982, 21p.] SR 82-65 Effects of inundation on six varieties of turfgrass. F.H., et al, [1982, 25p.] Gravel
catchments. Slaughter, C.W., et al. [1981, p.39-48] MP 1518 loc-cored mounds at Sukakpak Mountain, Brooks Range, Brown, J., et al. [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] SR 85-03 Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V.,	Influence of irregularities of the bed of an ice aheet on deposition rate of till. Nobles, L.H., et al., t1971, p.117-126, MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., (1972, p.D70-D92) Depth of water-filled crevesses that are closely spaced. R5b-in, G. de Q., et al., t1974, p.543-544) MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., t1977, p.617-631; MP 1079 Oxygen isotopes in the besel zone of Matanuska Giacier.	r[1982, 21p.] SR 82-85 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] CR 80-03 Plant growth on a gravel soil: greenhouse studies. Palazzo,
catchments. Slaughter, C.W., et al. (1981, p.39-48) MP 1518 Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. (1983, p.91-96) MP 1653 Periglacial landforms and processes, Kensi Mts., Aleaka. Bailey, P.K., (1985, 60p.) SR 85-43 Geophysical eneweys Geophysical methods for hydrological investigations in permarket regions. Hoekstra, P., (1976, p.75-90) MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., (1976, 19p.) CR 76-37	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MF 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robim, G. de Q., et al., [1974, p.543-544) MF 1038 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MF 1079 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1978, p.673-685] MF 1177	gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1982, 25p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alsaks. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.]
catchments. Slaughter, C.W., et al. [1981, p.39-48]. MP 1518 loc-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. [1983, p.91-96]. MP 1653 Periglacial landforms and processes, Kenai Min., Alaska, Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical surveys Geophysical methods for hydrological investigations in per- mafrost regions. Hoekstra, P., [1976, p.75-90]. MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al. [1976, 19p.]. CR 76-37 Selected examples of radiohm resistivity surveys for geotech-	Influence of irregularities of the bed of an ice aheet on deposition rate of till. Nobles, L.H., et al., t1971, p.117-126, MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., MP 1679 C-15 of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., t1974, p.543-544, MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., t1977, p.617-631, MP 1679 Ozygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., t1978, p.673-685, MP 1677 Radar wave speeds in polar glaciers. Jezek, K.C., et al.	c1982, 21p.] SR 82-85 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hockstra, P., et al., [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alsaka. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] SR 81-04 Grazing
catchments. Slaughter, C.W., et al. (1981, p.39-48) MP 1518 Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. (1983, p.91-96) MP 1653 Periglacial landforms and processes, Kensi Mts., Aleaka. Bailey, P.K., (1985, 60p.) SR 85-43 Geophysical eneweys Geophysical methods for hydrological investigations in permarket regions. Hoekstra, P., (1976, p.75-90) MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., (1976, 19p.) CR 76-37	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1079 Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1978, 673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.1335-	grivate and the province of th
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaks. Beiley, P.K., [1985, 60p.] Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al,	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., MP 1679 C-14 and other isotope studies on natural ice. Oeschger, H., MP 1679 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1679 Ozygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1978, p.673-685] MP 177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1844	grives, 21p.] SR 82-85 Effects of inundation on six varieties of turigrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alaska. Palszzo, A.J., et al., [1980, 21p.] CR 80-03 Plant growth on a gravel soil: greenhouse studies. Palszzo, A.J., et al., [1981, 8p.] Grazing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli,
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., [1985, 60p.] SR 25-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115]	Influence of irregularities of the bed of an ice aheet on deposition rate of till. Nobles, L.H., et al., t1971, p.117-126, MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., t1972, p.D70-D92; MP 1685 Depth of water-filled creveases that are closely spaced. Robin, G. de Q., et al., t1974, p.543-544; MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., t1977, p.617-631; MP 1679 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.B., et al., t1978, p.673-685; MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., t1983, p.199-208; MP 2657 Rheology of glacier ice. Jezek, K.C., et al., t1985, p.1335-1337; MP 1844 Glacier mass balance	c1982, 21p.] SR 82-85 Effects of inundation on six varieties of turigrass. Erbisch, F.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hockstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grashag Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160) MP 970
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loc-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaks. Bailey, P.K., [1985, 60p.] Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.]	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., MP 1679 C-14 and other isotope studies on natural ice. Oeschger, H., MP 1679 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1679 Ozygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1978, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335- 1337) MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27) MP 1461	c1982, 21p.] SR 82-85 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alsaka. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grasting Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160) Greet Lakes Effect of vessel size on shorelines along the Great Lakes chan-
catchments. Slaughter, C.W., et al., [1981, p.39-48]. MP 1518 Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96]. MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleska. Balley, P.K., [1985, 60p.] Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90]. MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Sellmann, P.V., et al., [1976, 19p.] Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115]. Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] Electrical resistivity of frozen ground. Arcone, S.A., [1979, 79-16].	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1699 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robim, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1079 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1978, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-2087 Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27] MP 1461 Glacier mesiting	c1982, 21p.] SR 82-85 Effects of inundation on six varieties of turigrass. Erbisch, F.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hockstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grazing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160) MP 970 Great Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] SR 83-11
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Periglacial landforms and processes, Kenai Mts., Aleaka. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] SR 79-14 Electrical resistivity of frozen ground. Arcone, S.A., [1979, p.32-37]	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., MP 1679 C-14 and other isotope studies on natural ice. Oeschger, H., MP 1679 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1679 Ozygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1978, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335- 1337) MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27) MP 1461	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzii, G.O., et al., [1976, p.153-160] MP 943 Influence of grazing on Arctic tundra ecosystems. Batzii, G.O., et al., [1976, p.153-160] Great Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Gressland
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaka. Bailey, P.K., [1985, 60p.] SR 25-63 Geophysical enerweys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Scott, W.J., et al., [1979, 7p.] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] Blectrical resistivity of frozen ground. Arcone, S.A., [1979, p.32-37] Subsea permafrost study in the Beaufort Sea, Aleaka. Sellmann, P.V., et al., [1979, p.207-213] MP 1821	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1038 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1079 Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1977, p.617-631] MP 1079 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1344 Cincler mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, B.J., et al., [1980, p.18-27] MP 1461 Cincler mass balance Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522 Subserial sediment flow of the Matanuska Giacier, Alaska.	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turigrass. Erbisch, P.H., et al, [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al, [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palszzo, A.J., et al, [1980, 21p.] CR 80-43 Plant growth on a gravel soil: greenhouse studies. Palszzo, A.J., et al, [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al, [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzii, G.O., et al, [1976, p.153-160] Greet Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland climate changes shown by ice core. Danagaard,
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loc-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] Blectrical resistivity of frozen ground. Arcone, S.A., [1979, p.23-27] Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] MP 1523 Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] MP 1991 Geophysics of subglacial geology at Dye 3, Greenland.	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D76-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1679 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.B., et al., [1987, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.193-35-1337] Glacier must balence Planetary and extraplanetary event records in polar ice caps. Zeller, B.J., et al., [1980, p.18-27] MP 1461 Glacier musting Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522 Subaerial sediment flow of the Matanuska Glacier, Alaska. Lawson, D.B., [1982, p.279-300) MP 1866	grives, 21p.] SR 82-45 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzii, C.O., et al., [1976, p.153-160] Greenland SR 83-11 Greenland Climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loc-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] SR 85-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.] RR 9-14-18 Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) MP 1941	Influence of irregularities of the bed of an ice aheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1679 Ozygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1978, p.673-685] MP 1679 Recology of glacier ice. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.1337-] MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27] MP 1461 Glacier meliting Approach roads, Greenland 1955 program. [1959, 100p., MP 1522 Subserial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1896 Glacier escillation	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alsaka. Palazzo, A.J., et al., [1980, 21p.] CR 80-43 Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] Greet Lakes Effect of vessel size on shorelines along the Great Lakes channels. Weebben, J.L., [1983, 62p.] Gressland Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] MP 997
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaks. Bailey, P.K., [1985, 60p.] Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.33-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.32-37] Subses permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.22-37] Subses permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) MP 1941 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.]	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D76-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1679 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.B., et al., [1987, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.193-35-1337] Glacier must balence Planetary and extraplanetary event records in polar ice caps. Zeller, B.J., et al., [1980, p.18-27] MP 1461 Glacier musting Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522 Subaerial sediment flow of the Matanuska Glacier, Alaska. Lawson, D.B., [1982, p.279-300) MP 1866	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, F.H., et al, [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hockstra, P., et al, [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al, [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al, [1981, 8p.] Grazing Word model of the Barrow ecosystem. Brown, J., et al, [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzii, G.O., et al, [1976, p.153-160] Green Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland Greenland climate changes shown by ice core. Danagaard, W., et al, [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al, [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Her-
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loc-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] SR 85-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.32-37] Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) MP 1941 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] SR 85-65	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1699 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1079 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1978, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27] MP 1646 Glacier meelting Approach roads, Greenland 1955 program. [1959, 100p., MP 1822 Subaerial sediment flow of the Matanuska Glacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1896 Glacier ceellistien Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposits in the glacial environment. Lawson, D.E., [1981,	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, F.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alsaks. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] Great Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p.] Sudy of piles installed in polar snow. Kovaca, A., [1976,
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Blectromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] Blectromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.32-37] Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] MP 1523 Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] MP 15291 Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) Morkshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] SR 85-65 Review of methods for generating synthetic seismograms.	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1038 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1079 Oxygon isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1978, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.1333-1337] Glacier mass balance Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., [1980, p.18-27] MP 1461 Clacier melting Approach roads, Greenland 1955 program. [1959, 100p., MP 1522 Subserial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1896 Glacier oscillation Glisciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposits in the glacial environment. Lawson, D.E., [1981, 27]	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] CR 80-03 Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grazing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzii, G.O., et al., [1976, p.153-160] Greenland. Wuebben, J.L., [1983, 62p.] Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p.] CR 76-23 Study of piles installed in polar anow. Kovacs, A.,, [1976, 132p.]
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loc-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] SR 85-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.32-37] Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) MP 1941 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] SR 85-65	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D76-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1679 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.B., et al., [1978, p.673-685] MP 1677 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27] MP 1661 Glacier meeting Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522 Subaerial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.B., [1982, p.279-300] MP 1866 Glacier seculiation Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposita in the glacial environment. Lawson, D.B., [1981, 16p.] Glacier serveys	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grashing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] Great Lakes Effect of vessel size on shorelines along the Great Lakes channels. Weebben, J.L., [1983, 62p.] Growland Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Crysgin isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p.] CR 76-24 Study of piles installed in polar snow. Kovacs, A.,, [1976, 132p.] Geodetic positions of borehole sites in Greenland. Mock,
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] Blectrical resistivity of frozen ground. Arcone, S.A., [1979, p.32-37] Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110] Morkahop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., [1985, 39p.]	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1038 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1978, p.673-685] MP 1079 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.1333-1337] Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, B.J., et al., [1980, p.18-27] Glacier melting Approach roads, Greenland 1955 program. [1959, 100p., MP 1522 Subserial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1866 Glacier ceellistica Glisciology's grand unsolved problem. Weertman, J., (1976, p.284-286) Deposits in the glacial environment. Lawson, D.E., [1981, 27] Glacier terreyry Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., (1980, 9p.)	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] MP 943 Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] Greenland Greenland climate changes shown by ice core. SR 83-11 Groenland Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p.] Study of piles installed in polar snow. Kovacs, A., [1976, 7p.] Grodetic positions of borehole sites in Greenland. Mock, S.J., [1976, 7p.] Atmospheric trace metals and sulfate in the Greenland loe
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loc-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaks. Bailey, P.K., [1985, 60p.] SR 85-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.32-37] Sabses permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.20-212] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110] Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] Review of methods for generating synthetic seismograms. Peck, L., [1985, 39p.] Germany —Munich Prozen precipitation and weather, Munchen/Riem, West	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D76-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1679 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.B., et al., [1978, p.673-685] MP 1677 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice caps. Zeller, B.J., et al., [1980, p.18-27] MP 1661 Glacier melting Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522 Subserial sediment flow of the Matanuska Giscier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1866 Glacielogy's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposits in the glacial environment. Lawson, D.E., [1981, 1972] Glacier serveys Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] Bibliography on glaciers and permafrost, China, 1938-1979.	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alsaks. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] Great Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p.] Geodetic positions of borehole sites in Greenland. Mock, S.J., [1976, 7p.] Atmospheric trace metals and sulfate in the Greenland loe Sheet. Herron, M.M., et al., [1977, p.915-920)
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] Blectrical resistivity of frozen ground. Arcone, S.A., [1979, p.32-37] Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110] Morkahop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., [1985, 39p.]	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1038 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1978, p.673-685] MP 1079 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.1333-1337] Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, B.J., et al., [1980, p.18-27] Glacier melting Approach roads, Greenland 1955 program. [1959, 100p., MP 1522 Subserial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1866 Glacier ceellistica Glisciology's grand unsolved problem. Weertman, J., (1976, p.284-286) Deposits in the glacial environment. Lawson, D.E., [1981, 27] Glacier terreyry Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., (1980, 9p.)	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] MP 943 Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] Greenland Greenland climate changes shown by ice core. SR 83-11 Groenland Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p.] Study of piles installed in polar snow. Kovacs, A., [1976, 7p.] Grodetic positions of borehole sites in Greenland. Mock, S.J., [1976, 7p.] Atmospheric trace metals and sulfate in the Greenland loe
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loc-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] SR 85-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.93-117] Report State of the study of the sellmann, P.V., et al., [1979, p.32-37] P. D. SR 79-14 Electrical resistivity of frozen ground. Arcone, S.A., [1979, p.32-37] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110] MP 1941 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] SR 85-65 Review of methods for generating synthetic seismograms. Pock, L., [1985, 39p.] Germany. Bilello, M.A., [1984, 47p.] SE 84-32 Glacial depealts Influence of irregularities of the bed of an ice sheet on deposi-	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1699 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1632 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1079 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1978, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27] MP 1646 Glacier meeting Approach roads, Greenland 1955 program. [1959, 100p., MP 1822 Subaerial sediment flow of the Matanuska Glacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1896 Glacier escillation Glaciology's grand unsolved problem. Weertman, J., (1976, p.284-286) Deposits in the glacial environment. Lawson, D.E., [1981, 16p.) Glacier serveys Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., (1980, 9p.) Shen, J., ed., [1982, 44p.) Glacier thickness Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Antarctica. Kovaca, Radio echo sounding in the Allan Hills, Anta	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alsaka. Palazzo, A.J., et al., [1980, 21p.] Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] Greet Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p.] Greenland. Mock, S.J., [1976, 7p.] Greenland. Mock, S.J., [1976, 7p.] Atmospheric trace metals and sulfate in the Greenland loe Sheet. Herron, M.M., et al., [1977, p.915-920] MP 949 Vanadium and other elements in Greenland cores. Herron, M.M., et al., [1977, p.98-102] MP 1992 MP 1992 Vanadium and other elements in Greenland cores. Herron, M.M., et al., [1977, p.98-102] MP 1992 Vanadium and other elements in Greenland cores. Herron, M.M., et al., [1977, p.98-102] MP 1992
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1623 Perigiacial landforms and processes, Kenai Mts., Aleaka. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SER 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, rp.] Blectrical resistivity of frozen ground. Arcone, S.A., [1979, p.32-37] Subsea permafrost study in the Beaufort Sea, Aleaka. Sellmann, P.V., et al., [1979, p.207-213] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) Morkshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] Review of methods for generating synthetic seismograms. Peck, L., [1985, 39p.] CR 85-10 Germany. Bilelio, M.A., [1984, 47p.] SER 84-32 Glacial depects Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126]	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] NP 1079 Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1978, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] Giacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, B.J., et al., [1980, p.18-27] MP 1461 Glacier massibage Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522 Subserial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1806 Glacier escellation Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposits in the glacial environment. Lawson, D.E., [1981, 16p.] Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] Shen, J., ed., [1982, 44p.] Glacier thickness Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] SR 80-23 Redio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.]	gright control in the
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaks. Bailey, P.K., [1985, 60p.] Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.32-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.32-37] Subses permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.32-37] MP 1623 Subses permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.22-27] MP 1623 Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) MP 1941 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] Review of methods for generating synthetic seismograms. Peck, L., [1985, 39p.] Germany. Bilello, M.A., [1984, 47p.] SR 84-32 Glacial deposits Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.17-126). MP 1969	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1038 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1978, p.673-685] MP 1079 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] Glacier mest balance Planetary and extraplanetary event records in polar ice capa. Zeller, B.J., et al., [1980, p.18-27] MP 1461 Glacier melting Approach roads, Greenland 1955 program. [1959, 100p., MP 1522 Subserial sediment flow of the Matanuska Glacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1896 Glacier escillation Glisciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposits in the glacial environment. Lawson, D.E., [1981, 16p.] Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] SR 80-23 Bibliography on glaciers and permafrost, China, 1938-1979. SR 82-23 Glacier thickness Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] Glacier thickness Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] Glacier thickness Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.]	grives, 21p.] SR 82-45 Effects of inundation on six varieties of turigrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] CR 80-03 Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al., [1976, p.153-160] Great Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p.] Greenland. CR 76-24 Study of piles installed in polar snow. Kovaca, A.,, [1976, 132p.] Groedetic positions of borehole sites in Greenland. Mock, S.J., [1976, 7p.] Atmospheric trace metals and sulfate in the Greenland. Sc., [1976, 41] Atmospheric trace metals and sulfate in the Greenland cores. Herron, M.M., et al., [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1970, p.98-102] MP 949
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaka. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.93-115] Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.32-37] Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.32-37] Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) Merkabop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., [1985, 39p.] Germany Mentalogian Alaska. Generating synthetic seismograms. Peck, L., [1985, 39p.] Germany Mentalogian Selfello, M.A., [1984, 47p.] SR 84-32 Glacial depends Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1869 Sediments of the western Matanuska Clacier. Lewson, D.E., [1979, 112p.] CR 75-69	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., (1971, p. 117-126) MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., (1972, p. D70-D92) Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., (1974, p. 543-544) MP 1632 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., (1977, p.617-631) Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., (1978, 673-685) MP 1079 Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., (1985, p. 673-685) Rheology of glacier ice. Jezek, K.C., et al., (1983, p. 199-208) Rheology of glacier ice. Jezek, K.C., et al., (1983, p. 1333-1337) Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, B.J., et al., (1980, p. 18-27) MP 1461 Glacier mesting Approach roads, Greenland 1955 program. (1959, 100p., MP 1822 Subserial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.E., (1982, p. 279-300) MP 1896 Glacier setllastica Glaciology's grand unsolved problem. Weertman, J., (1976, p. 284-286) Deposits in the glacial environment. Lawson, D.E., (1981, 16p.) CR 83-27 Glacier thickness Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., (1980, 9p.) Shen, J., ed., (1982, 44p.) Glacier Water flow through veins in ice. Colbeck, S.C., (1976, 5p.) CR 76-06	great Lakes Rectables Rectables
catchments. Slaughter, C.W., et al. (1981, p.39-48) MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. (1983, p.91-96) MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaks. Bailey, P.K., (1985, 60p.) SR 85-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., (1976, p.75-90) MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., (1976, 19p.) CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., (1977, 16p.) SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., (1979, p.93-115) Electromagnetic survey in permafrost. Sellmann, P.V., et al., (1979, p.32-37) Sabses permafrost study in the Beaufort Sea, Alaaka. Sellmann, P.V., et al., (1979, p.207-213) MP 1623 Sabses permafrost study in the Beaufort Sea, Alaaka. Sellmann, P.V., et al., (1979, p.207-213) MP 1623 Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., (1985, p.105-110) Mr 1941 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., (1985, 113p.) SR 85-85 Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) Germany —Minatch Frozen precipitation and weather, Munchen/Riem, West Germany. Bilello, M.A., (1984, 47p.) SR 84-32 Glacial deposits Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., (1971, p.117-126) MP 1699 Sediments of the western Matanuska Clacier. Lawson, D.E., (CR 79-69)	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1679 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.B., et al., [1978, p.673-685] MP 1877 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.199-208] MP 1871 Glacier must shalence Planetary and extraplanetary event records in polar ice caps. Zeller, B.J., et al., [1980, p.18-27] MP 1846 Glacier melting Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522 Subaerial sediment flow of the Matanuska Glacier, Alaska. Lawson, D.B., [1982, p.279-300] MP 1896 Glacier seelllation Glaciology's grand unsolved problem. Weertman, J., (1976, p.284-286) Deposits in the glacial environment. Lawson, D.B., [1981, 16p.] Glacier serveys Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] SR 80-23 Bibliography on glaciers and permafrost, China, 1938-1979. Shen, J., ed., [1982, 44p.] Glacier Water flow through veins in ice. Colbeck, S.C., (1976, 5p.) CR 76-06 Hydraulic transients: a seismic source in volcanoes and gla-	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al, [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al, [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al, [1980, 21p.] CR 80-03 Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al, [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al, [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al, [1976, p.153-160) Gravet Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland climate changes shown by ice core. Danagaard, W., et al, [1971, p.17-22] Crysgm isotope profiles through ice sheets. Johnsen, S.J., et al, [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1976, 4p.] CR 76-24 Study of piles installed in polar snow. Kovaca, A., [1976, 132p.] Atmospheric trace metals and sulfate in the Greenland. Mock, S.J., [1976, 7p.] Atmospheric trace metals and sulfate in the Greenland cosheet. Herron, M.M., et al, [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1993 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1993 Nandium
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] SR 85-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.93-125] Rectrical resistivity of frozen ground. Arcone, S.A., [1979, p.32-37] Subses permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.207-213] MP 1941 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., [1985, 39p.] Germany —Memich Frozen precipitation and weather, Munchen/Riem, West Germany. Bilello, M.A., [1984, 47p.] SR 84-32 Glacial deposits Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126, MP 1699 Sediments of the western Matanuska Clacier. Lawson, D.B., [1979, p.629-645) MP 1276 MP 1276	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1038 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] NP 1079 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1977, p.617-631] Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1344 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27] MP 1461 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27] MP 1846 Glacier mass balance Planetary and extraplanetary event records in Polar ice capa. Zeller, E.J., et al., [1980, p.18-27] MP 1852 Subserial sediment flow of the Matanuska Glacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1896 Glacier escillation Glaciology's grand unsolved problem. Weertman, J., 1976, p.284-286; Deposits in the glacial environment. Lawson, D.E., [1981, 16p.] CR 83-27 Glacier surveys Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] Shen, J., ed., [1982, 44p.] Glaciere Water flow through veins in ice. Colbeck, S.C., [1976, 5p.] CR 76-06 Hydraulic transients: a seismic source in volcances and glaciers. St. Lawrence, W.F., et al., [1979, p.654-656]	great Lakes Brect lakes Brown J. 1, 1982, 25p., SR 82-85 Brects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p., SR 82-12 Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hockstra, P., et al., [1977, 16p., SR 77-01 Revegetation at two construction sites in New Hampshire and Alsaka. Palazzo, A.J., et al., [1980, 21p., CR 80-03 Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al., [1981, 8p., SR 81-04 Grazing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzii, G.O., et al., [1976, p.153-160] Great Lakes Brect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p., SR 83-11 Gressland Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434, NRP 998 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p., CR 76-23 Geodetic positions of borehole sites in Greenland. Mock, S.J., [1976, 7p., Atmospheric trace metals and sulfate in the Greenland lce Sheet. Herron, M.M., et al., [1977, p.98-102] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102] MP 1835 Application of a numerical sea ice model to the Bast Greenland area. Tucker, W.B., [1982, 40p., CR 82-16
catchments. Slaughter, C.W., et al. (1981, p.39-48) MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. (1983, p.91-96) MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaks. Bailey, P.K., (1985, 60p.) SR 85-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., (1976, p.75-90) MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., (1976, 19p.) CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., (1977, 16p.) SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., (1979, p.93-115) Electromagnetic survey in permafrost. Sellmann, P.V., et al., (1979, p.32-37) Sabses permafrost study in the Beaufort Sea, Alaaka. Sellmann, P.V., et al., (1979, p.207-213) MP 1623 Sabses permafrost study in the Beaufort Sea, Alaaka. Sellmann, P.V., et al., (1979, p.207-213) MP 1623 Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., (1985, p.105-110) Mr 1941 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., (1985, 113p.) SR 85-85 Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) Germany —Minatch Frozen precipitation and weather, Munchen/Riem, West Germany. Bilello, M.A., (1984, 47p.) SR 84-32 Glacial deposits Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., (1971, p.117-126) MP 1699 Sediments of the western Matanuska Clacier. Lawson, D.E., (CR 79-69)	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1699 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1632 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1079 Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al., [1978, p.673-685] MP 1177 Radar wave speeds in polar glaciera. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., [1980, p.18-27] MP 1846 Glacier mesting Approach roads, Greenland 1955 program. [1959, 100p., MP 1822 Subaerial sediment flow of the Matanuska Glacier, Alaska. Lawson, D.E., [1982, p.279-300) MP 1896 Glacier seellistion Glaciology's grand unsolved problem. Weertman, J., (1976, p.284-286) Deposits in the glacial environment. Lawson, D.E., [1981, 16p.) Glacier serveys Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., (1980, 9p.) Shen, J., ed., [1982, 44p.] Glacier betickness Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., (1980, 9p.) Glaciers Water flow through veins in ice. Colbeck, S.C., (1976, 5p.) CR 76-06 Hydraulic transients: a seismic source in volcances and glaciers. St. Lawrence, W.F., et al., (1979, p.654-656) MP 1181 Dynamics of snow and ice masses. Colbeck, S.C., ed.,	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al, [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al, [1977, 16p.] SR 77-01 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al, [1980, 21p.] CR 80-03 Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al, [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al, [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzli, G.O., et al, [1976, p.153-160) Gravet Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland climate changes shown by ice core. Danagaard, W., et al, [1971, p.17-22] Crysgm isotope profiles through ice sheets. Johnsen, S.J., et al, [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1976, 4p.] CR 76-24 Study of piles installed in polar snow. Kovaca, A., [1976, 132p.] Atmospheric trace metals and sulfate in the Greenland. Mock, S.J., [1976, 7p.] Atmospheric trace metals and sulfate in the Greenland cosheet. Herron, M.M., et al, [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1977, p.98-102] MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1992 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1993 Nandium and other elements in Greenland to cores. Herron, M.M., et al, [1977, p.98-102] MP 1993 Nandium
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Aleaka. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Sign 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.93-215] Subsea permafrost study in the Beaufort Sea, Aleaka. Sellmann, P.V., et al., [1979, p.207-213] MP 1523 Subsea permafrost study in the Beaufort Sea, Aleaka. Sellmann, P.V., et al., [1979, p.207-213] MP 1591 Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) Morkabop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] Signassy —Minish Frozen precipitation and weather, Munchen/Riem, West Germany. Bilello, M.A., [1984, 47p.] Signassy —Minish Frozen precipitation of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1869 Sediments of the western Matanuska Glacier. Lawson, D.E., [1979, 112p.] Pubble orientation ice and glacial deposits. Lawson, D.E., [1979, D.E., [1981, p.78-84] MP 1276 Diamictons at the margin of the Matanuska Glacier, Aleaka. Lawson, D.E., [1981, p.78-84] MP 1276 Deposits in the glacial environment. Lawson, D.E., [1981, 1981, MP 1276	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1632 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1977, p.617-631] NP 1079 Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1976, p.673-685] MP 1077 Radar wave speeds in polar giaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] Giacier mass balence Planetary and extraplanetary event records in polar ice capa. Zeller, B.J., et al., [1980, p.18-27] MP 1461 Glacier massibage Approach roads, Greenland 1955 program. [1959, 100p., MP 1522 Subserial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1806 Glacior escellation Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposits in the glacial environment. Lawson, D.E., [1981, 16p.) Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] SR 20-23 Bibliography on glaciers and permafrost, China, 1938-1979 Shen, J., ed., [1982, 44p.) Glaciere Water flow through veins in ice. Colbeck, S.C., (1976, 5p.) CR 76-06 Hydraulic transients: a seismic source in volcances and glaciers. St. Lawrence, W.F., et al., [1979, p.654-656] MP 1181 Dynamics of snow and ice masses. Colbeck, S.C., ed., (1980, 468p.)	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1981, 8p.] Grassing Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzii, G.O., et al., [1976, p.153-160] Great Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Study of piles installed in polar anow. Kovacs, A.,, [1976, 7p.] Grodetic positions of borehole sites in Greenland. Mock, S.J., (1976, 7p.) CR 76-23 Geodetic positions of borehole sites in Greenland. Mock, S.J., (1976, 7p.) Amospheric trace metals and sulfate in the Greenland Ice Sheet. Herron, M.M., et al., [1977, p.98-102) MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102) MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102) MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102) MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102) MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102, MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1978, 1999, MP 1535 Application of a numerical sea ice model to the East Greenland area. Tucker, W.B., [1981, 109p.] Application of a numerical sea ice model to the East Greenland area. Tucker, W.B., [1982, 40p.) CR 28-16 CR 28-
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., [1985, 60p.] Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Representation. Hoekstra, P., et al., [1977, 16p.] Sig. 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.33-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.33-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.32-37] MP 1266 Belectromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.32-37] MP 1523 Subses permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., [1979, p.22-37] MP 1523 Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) Mr 1994 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] Review of methods for generating synthetic seismograms. Peck, L., [1985, 39p.] Germany —Minach Frozen precipitation and weather, Munchen/Riem, West Germany. Bilello, M.A., [1984, 47p.] Sig 84-32 Glacial deposits Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126, MP 1899 Sediments of the western Matanuska Glacier. Lawson, D.E., [1979, p.229-645] Dismictores at the margin of the Matanuska Glacier. Lawson, D.E., [1979, p.263-645] Dismictores at the margin of the Matanuska Glacier. Lawson, D.E., [1981, p.78-84] Deposits in the glacial environment. Lawson, D.E., [1981, p.78-84] Deposits in the glacial environment. Lawson, D.E., [1981, p.78-84] Deposits in the glacial environment. Lawson, D.E., [1981, p.78-84]	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Depth of water-filled crevesses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1038 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1978, p.673-685] MP 1079 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1983, p.1333-1337] Glacier meass balance Planetary and extraplanetary event records in polar ice capa. Zeller, E.J., et al., [1980, p.18-27] MP 1461 Glacier melting Approach roads, Greenland 1955 program. [1959, 100p., MP 1522 Subserial sediment flow of the Matanuska Glacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1896 Glacier escillation Glisciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposits in the glacial environment. Lawson, D.E., [1981, 16p.) SR 82-23 Bibliography on glaciers and permafrost, China, 1938-1979. Shen, J., ed., [1982, 44p.] Glacier thickness Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.) Glaciers Water flow through veins in ice. Colbeck, S.C., (176, 5p.) CR 76-06 Hydraulic transients: a seismic source in volcances and glaciers. St. Lawrence, W.F., et al., [1979, p.654-656] MP 1297 Glaciology Glaciery Glaciology Glaciology	great Lakes Effect of results on shorelines along the Great Lakes changes. J.L., 1982, 1982, 1983, 1982, 1983, 1982, 1983, 1982, 1983, 1982, 1982, 1983, 1982, 1983, 1983, 1983, 1983, 1983, 1983, 1982, 1982, 1982, 1983, 1983, 1983, 1983, 1983, 1983, 1982, 1982, 1982, 1983, 1983, 1983, 1983, 1982, 1982, 1982, 1982, 1983, 1983, 1983, 1983, 1983, 1982, 1983, 1982, 1983, 1983, 1983, 1983, 1983, 1983, 1982, 1983, 1982, 1983, 1983, 1983, 1983, 1983, 1983, 1983, 1984, 1983, 1984, 1983, 1984, 1983, 1984, 1983, 1984, 19
catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1633 Perigiacial landforms and processes, Kenai Mts., Aleaka. Bailey, P.K., [1985, 60p.] Geophysical surveys Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., [1976, p.75-90] MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., [1976, 19p.] Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., [1979, p.93-115] Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, p.93-115] Subsea permafrost survey in the Beaufort Sea, Aleaka. Sellmann, P.V., et al., [1979, p. 207-213] MP 1523 Subsea permafrost study in the Beaufort Sea, Aleaka. Sellmann, P.V., et al., [1979, p. 207-213] Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., [1985, p.105-110) Morkabop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., [1985, 113p.] SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., [1985, 39p.] Germany —Minsich Frozen precipitation and weather, Munchen/Riem, West Germany. Bilelio, M.A., [1984, 47p.] SR 84-32 Glacial depealts Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1699 Sediments of the western Matanuska Glacier. Lawson, D.E., [1979, p.129-3) Pubble orientation ice and glacial deposits. Lawson, D.E., [1979, p.29-645) Lawson, D.E., [1981, p.78-84] MP 1276 Diamictons at the margin of the Matanuska Glacier, Aleaka. Lawson, D.E., [1981, p.78-84] MP 1260 Subserial sediment flow of the Matanuska Glacier, Aleaka. Lawson, D.E., [1982, p.779-300, MP 1806	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1638 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] Oxygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.B., et al., [1978, p.673-685] MP 1079 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, B.J., et al., [1980, p.18-27] MP 1461 Glacier mass balance Planetary and extraplanetary event records in polar ice capa. Zeller, B.J., et al., [1980, p.18-27] MP 1462 Glacier mass balance Approach roads, Greenland 1955 program. [1959, 100p., MP 1822 Subserial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1896 Glacier escillation Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposits in the glacial environment. Lawson, D.E., [1981, 16p.) Glacier serveys Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] Shen, J., ed., [1982, 44p.] Glacier Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Hydraulic transients: a seismic source in volcanoes and glaciers. St. Lawrence, W.F., et al., [1975, p.435-441, 475-487] Glaciology Snow and ice. Colbeck, S.C., et al., [1975, p.435-441, 475-487] MP 244	c1982, 21p.] SR 82-48 Effects of inundation on six varieties of turfgrass. Erbisch, P.H., et al., [1982, 25p.] Gravel Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., [1977, 16p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1981, 8p.] Grands Word model of the Barrow ecosystem. Brown, J., et al., [1970, p.41-43] Influence of grazing on Arctic tundra ecosystems. Batzii, G.O., et al., [1976, p.153-160] Great Lakes Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] Greenland climate changes shown by ice core. Danagaard, W., et al., [1971, p.17-22] Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al., [1972, p.429-434] Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1976, 4p.] Grodetic positions of borehole sites in Greenland. Mock, S.J., [1976, 7p.] CR 76-23 Geodetic positions of borehole sites in Greenland loc Sheet. Herron, M.M., et al., [1977, p.98-102) MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102) MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102) MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102) MP 949 Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102) SR 84-12 Application of a numerical sea ice model to the East Greenland area. Tucker, W.B., [1981, 109p.] Application of a numerical sea ice model to the East Greenland area. Tucker, W.B., [1981, 109p.] Application of a numerical sea ice model to the East Greenland area. Tucker, W.B., [1981, 109p.] Application of a numerical sea ice model to the East Greenland area. Tucker, W.B., [1982, 40p.) CR 28-16 MP 949 Developing a water well for the ice backfilling of DYE-
catchments. Slaughter, C.W., et al. (1981, p.39-48) MP 1518 loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al. (1983, p.91-96) MP 1653 Perigiacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., (1985, 60p.) SR 85-03 Geophysical methods for hydrological investigations in permafrost regions. Hoekstra, P., (1976, p.75-90) MP 932 Bedrock geology survey in northern Maine. Sellmann, P.V., et al., (1976, 19p.) CR 76-37 Selected examples of radiohm resistivity surveys for geotechnical exploration. Hoekstra, P., et al., (1977, 16p.) SR 77-01 Geophysics in the study of permafrost. Scott, W.J., et al., (1979, p.93-115) Electromagnetic survey in permafrost. Sellmann, P.V., et al., (1979, p.93-125) Electromagnetic survey in permafrost. Sellmann, P.V., et al., (1979, p.32-37) p.32-37, p.32-37, Selected examples of recommendation of the survey in permafrost. Sellmann, P.V., et al., (1979, p.20-212) Subsea permafrost study in the Beaufort Sea, Alaska. Sellmann, P.V., et al., (1979, p.207-213) Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al., (1985, p.105-110) MP 1941 Workshop on Permafrost Geophysics, Golden, Colorado, 23-24 October 1984. Brown, J., ed., (1985, 113p.) SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) SR 85-65 Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) Review of methods for generating synthetic seismograms. Peck, L., (1985, 39p.) Review of methods for generating synthetic seismograms. Peck, L., (1986, 1998, 1998, 1998, 1999, 1999, 1999, 1999, 1999, 1999, 1999, 1999,	Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1669 C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] Depth of water-filled crevasses that are closely spaced. Robin, G. de Q., et al., [1974, p.543-544] MP 1038 Changes in the composition of atmospheric precipitation. Cragin, J.H., et al., [1977, p.617-631] MP 1079 Ozygen isotopes in the basal zone of Matanuska Giacier. Lawson, D.E., et al., [1978, p.673-685] MP 1177 Radar wave speeds in polar glaciers. Jezek, K.C., et al., [1983, p.199-208] MP 2087 Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1844 Glacier mass balance Planetary and extraplanetary event records in polar ice caps. Zeller, B.J., et al., [1980, p.18-27] MP 1461 Glacier melting Approach roads, Greenland 1955 program. [1959, 100p., MP 1822 Subserial sediment flow of the Matanuska Giacier, Alaska. Lawson, D.E., [1982, p.279-300] MP 1896 Glacier cellistion Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Deposits in the glacial environment. Lawson, D.E., [1981, 16p.] Glacier surveys Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] Shen, J., ed., [1982, 44p.] Glacier surveys Radio echo sounding in the Allan Hills, Antarctica. Kovaca, A., [1980, 9p.] Shen, J., ed., [1982, 44p.] Glacier water flow through veins in ice. Colbeck, S.C., [1976, 5p.] CR 76-06 Hydraulic transients: a seismic source in volcances and givers. St. Lawrence, W.F., et al., [1979, p.654-654] MP 1297 Glaciology Snow and ice. Colbeck, S.C., et al., [1975, p.435-441, 475-	great Lakes Rect

4 • • • • • •		
Greenland (cost.)	Dielectric measurements of frozen silt using time domain re- flectometry. Delaney, A.J., et al, [1984, p.39-46]	Problems of offshore oil drilling in the Beaufort Sea. Weller, O., et al, [1978, p.4-11] MP 1286
lee flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al, (1984, p.185-190) MP 1824	MP 1775	Sea ice piling at Fairway Rock, Bering Strait, Alaska.
Secondary stress within the structural frame of DYE-3: 1978-	Field dielectric measurements of frozen silt using VHF pulses.	Kovacs, A., et al, [1981, p.985-1000] MP 1466
1983. Ueda, H.T., et al, [1984, 44p.] SR 84-26	Arcone, S.A., et al, [1984, p.29-37] MIP 1774 Compressive strength of frozen silt. Zhu, Y., et al, [1984,	Mass balance of a portion of the Ross Ice Shelf. Jezek, K.C., et al, [1984, p.381-384] MP 1919
Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., 1985, p.242-251, MP 1817	p.3-15; MP 1773	Ice properties in a grounded man-made ice island. Cox,
Geophysics of subglacial geology at Dye 3, Greenland.	Ice segregation and frost heaving. [1984, 72p.]	G.F.N., et al, (1986, p.135-142) MIP 2032
Jezek, K.C., et al, [1985, p.105-110] MP 1941	MP 1809	Greating
Deteriorated building panels at Sondrestrom, Greenland. Korhonen, C., [1985, p.7-10] MP 2017	Exploration of a rigid ice model of frost heave. O'Neill, K., et al, [1985, p.281-296] MP 1880	Grouting of soils in cold environments: a literature search. Johnson, R., [1977, 49p.] SR 77-42
-Comp Tate	Dielectric studies of permafrost. Arcone, S.A., et al, [1985,	Grouting silt and sand at low temperatures—a laboratory
Approach roads, Greenland 1955 program. [1959, 100p.]	p.3-5 ₁ MP 1951	investigation. Johnson, R., [1979, 33p.] CR 79-05
MP 1522	Galvanic methods for mapping resistive seahed features. Sellmann, P.V., et al, [1985, p.91-92] MIP 1955	Grouting silt and sand at low temperatures. Johnson, R., (1979, p.937-950) MP 1878
Greenland Sea	Impulse radar sounding of frozen ground. Kovacs, A., et al,	Growth
Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SR 82-28	[1985, p.28-40] MIP 1952	Analysis of processes of primary production in tundra growth
Marginal Ice Zone Experiment, Fram Strait/Greenland Sea,	Ground thawing	forms. Tieszen, L.L., et al, (1981, p.285-356) MP 1433
1984. Johannessen, O.M., ed, [1983, 47p.]	Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., (1978, p.615-621) MP 1102	Sessonal growth and accumulation of N. P. and K by grass
SR 83-12 Comparison of different sea level pressure analysis fields in	Resiliency of subgrade soils during freezing and thawing.	irrigated with wastes. Palazzo, A.J., [1981, p.64-68]
the East Greenland Sea. Tucker, W.B., [1983, p.1084-	Johnson, T.C., et al, [1978, 59p.] CR 78-23	MP 1425
1088 ₁ MP 1737	Neumann solution applied to soil systems. Lunardini, V.J., [1980, 7p.] CR 80-22	Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al, [1981, 8p.] SR 81-84
Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al, [1984, p.9-14] MP 1779	[1980, 7p.] CR 80-22 Effect of freezing and thawing on resilient modulus of granu-	Seasonal growth and uptake of nutrients by orchardgrass irri-
Physical properties of sea ice in the Greenland Sea. Tucker,	lar soils. Cole, D.M., et al, [1981, p.19-26]	gated with wastewater. Palazzo, A.J., et al, [1981, 19p.]
W.B., et al, [1985, p.177-188] MIP 1903	MP 1484	CR 81-66 Chena River Lakes Project revegetation study—three-year
Pressure ridge and ses ice properties Greenland Ses. Tucker, W.B., et al., [1985, p.214-223] MP 1935	CO2 effect on permafrost terrain. Brown, J., et al, 1982, 30p.; MP 1546	summary. Johnson, L.A., et al, [1981, 59p.]
Greend ice M. [1905, p.214-225] M. 1955	Dielectric properties of thawed active layers. Arcone, S.A.,	CR 81-18
Morphology of the North Slope. Walker, H.J., [1973, p.49-	et al, [1982, p.618-626] MP 1547	Vegetation selection and management for overland flow sys- tems. Palazzo, A.J., et al, [1982, p.135-154]
52 ₁ MP 1004	Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MIP 1597	MP 1511
Proposed size classification for the texture of frozen earth materials. McGaw, R., r1975, 10p.; MP 921	Lunardini, V.J., [1983, p.30-37] MP 1597 Thawing beneath insulated structures on permafrost. Lunar-	Wastewater treatment and plant growth. Palazzo, A.J.,
materials. McGaw, R., [1975, 10p.] MP 921 On the origin of pingos—a comment. Mackay, J.R., [1976,	dini, V.J., [1983, p.750-755] MP 1662	[1982, 21p.] SR 82-65 Effects of inundation on six varieties of turfgrass. Erbisch,
p.295-298 ₁ MP 916	Ground ice in perennially frozen sediments, northern Alaska.	F.H., et al, [1982, 25p.] SR 82-12
Pipeline haul road between Livengood and the Yukon River.	Lawson, D.E., [1983, p.695-700] MP 1661 Design implications of subsoil thawing. Johnson, T.C., et al,	Wastewater applications in forest ecosystems. McKim,
Berg, R.L., et al. [1976, 73p.] SR 76-11 Periodic structure of New Hampshire silt in open-system	[1984, p.45-103] MP 1706	H.L., et al, [1982, 22p.] CR \$2-19
freezing. McGaw, R., (1977, p.129-136) MP 902	Design and performance of water-retaining embankments in	Vegetation in two adjacent tundra habitats, northern Alaska. Roach, D.A., [1983, p.359-364] MIP 2864
Segregation-freezing temperature as the cause of suction	permafrost. Sayles, F.H., [1984, p.31-42] MP 1850	Aerosol growth in a cold environment. Yen, YC., [1984,
force. Takagi, S., [1977, p.59-66] MP 901	Shoreline erosion processes: Orwell Lake, Minnesota. Reid, J.R., [1984, 101p.] CR 84-32	21p. ₁ CR 84-06
Segregation freezing as the cause of suction force for ice lens formation. Takagi, S., [1978, 13p.] CR 78-06	Partial verification of a thaw settlement model. Guymon,	Hammers Stake driving tools: a preliminary survey. Kovacs, A., et al,
Segregation freezing as the cause of suction force for ice lens	G.L., et al, [1985, p.18-25] MP 1924	[1977, 43p.] SR 77-13
formation. Takagi, S., [1978, p.45-51] MIP 1061	Model for dielectric constants of frozen soils. Oliphant, J.L.,	Health
Determination of unfrozen water in frozen soil by pulsed	(1985, p.46-57) MP 1926 Thawing of frozen clays. Anderson, D.M., et al, (1985, p.1-	Health aspects of water reuse in California. Reed, S.C.,
nuclear magnetic resonance. Tice, A.R., et al, [1978, p.149-155] MIP 1097	9 ₁ MP 1923	[1979, p.434-435] MIP 1404 Health aspects of land treatment. Reed, S.C., (1979, 43p.)
Remote sensing of massive ice in permafrost slong pipelines	Repeated load triaxial testing of frozen and thawed soils.	MP 1389
		Mar 1997
in Alaska. Kovacs, A., et al, [1979, p.268-279]	Cole, D.M., et al, [1985, p.166-170] MP 2068	Heat balance
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175	Cole, D.M., et al, [1985, p.166-170] MIP 2068 Ground water	Heat beleace Approximate solution to Neumann problem for soil systems.
in Alaska. Kovacs, A., et al., [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] SR 79-14	Cole, D.M., et al. (1985, p.166-170) MP 2068 Greand water Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts. Satterwhite, M.B., et al. (1976, 34p.)	Heat belence Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al, [1981, p.76-81] MP 1494
in Alaska. Kovacs, A., et al., [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] SR 79-14 Freshwater pool radar-detected near an Alaskan river delta.	Cole, D.M., et al, [1985, p.166-170] MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts. Satterwhite, M.B., et al, [1976, 34p.] CR 76-48	Heat beleace Approximate solution to Neumann problem for soil systems.
in Alaska. Kovacs, A., et al. (1979, p.268-279) MP 1175 Blectromagnetic survey in permafrost. Sellmann, P.V., et al. (1979, 7p.) SR 79-14 Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al. (1979, p.161-164) MP 1224	Cole, D.M., et al., [1985, p.166-170] MIP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts. Satterwhite, M.B., et al., [1976, 34p.] CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washinston. Iskandar, I.K., et al., 1977, 34p.)	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al. (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597
in Alaska. Kovacs, A., et al., [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] SR 79-14 Freshwater pool radar-detected near an Alaskan river delta.	Cole, D.M., et al, [1985, p.166-170] MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts. Satterwhite, M.B., et al, [1976, 34p.] CR 76-48	Heat belence Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat belance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flux Measuring building R-values for large areas. Flanders, S.N.,
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. (TR 79-23) Drilling and coring of frozen ground in northern Alaska,	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et	Heat belence Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] Preezing and thawing: heat belance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1997 Heat flux Measuring building R-values for large areas. et al., [1981, p.137-138] MP 1388
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Blectromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.]	Cole, D.M., et al. (1985, p.166-170) MIP 2068 Ground water Rapid infiltration of primary sewage effluent at Port Devens, Massachusetts. Satterwhite, M.B., et al. (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al. (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al. (1978, 18p.)	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flux Measuring building R-values for large areas. et al., [1981, p.137-138] MP 1388 Bottom heat transfer to water bodies in winter. of al., [1981, 85.] SR 81-18 SR 81-18
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith.	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1694 Freezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 85-); Using soa ice to measure vertical heat flux in the oceas.
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Blectromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119]	Cole, D.M., et al, [1985, p.166-170] MIP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al, [1976, 34p.] CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al, [1977, 34p.] CR 77-24 Freah water supply for an Alaskan village. McFadden, T., et al, [1978, 18p.] Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al, [1978, p.55-61] MIP 1195 Bibliography on techniques of water detection in cold regions.	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flax Measuring building R-values for large areas. et al., (1981, p.137-138) Bottom heat transfer to water bodies in winter. et al., (1981, 8p.) Using sea ice to measure vertical heat flux in the ocean. MCPhee, M.G., et al., (1982, p.2071-2074) MP 1521
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. (To 79-23) Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flux Measuring building R-values for large areas. et al., (1981, p.137-138) NP 1388 Bottom heat transfer to water bodies in winter. et al., (1981, 85-) SR 81-18 Using soa ice to measure vertical heat flux in the coses. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Aadreas, B.L., (1982, 185-) CR 82-12
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) Detection of Arctic water supplies with geophysical tech-	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Freezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flux: Measuring building R-values for large areas. et al., (1981, p.137-138) Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) Using sea ice to measure vertical heat flux in the coean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Growth of faceted crystals in a snow cover. Colbeck, S.C.,
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Blectromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Blectromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669]	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 75-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, st al., (1981, 8p.) Using sea ice to measure vertical heat flux in the coean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.)
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Cham-	Cole, D.M., et al, [1985, p.166-170] MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts. Satterwhite, M.B., et al, [1976, 34p., CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al, [1977, 34p., CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al, [1978, 18p.] Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al, [1978, p.55-61] MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp. [1979, 75p.] Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al, [1979, 30p.] CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al, [1979, p.161-164] MP 1224	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flax: Measuring building R-values for large areas. et al., (1981, p.137-138) MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., SR 61-18 Using sea ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subarctic basins. Lepptirants, M., (1983, p.59-70) MP 2643
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] MP 1486	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Freah water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp, (1979, 75p.) Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al., (1979, p.161-164) MP 1224 Strength of frozen silt as a function of ice content and dry unit	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flux Measuring building R-values for large areas. et al., (1981, p.137-138) MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8.5.) Using soa ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Aadreas, E.L., (1982, 185.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subarctic basins. Leppiranta, M., (1983, p.5-70) MP 2623 Preezing in a pipe with turbulent flow. Albert, M.R., et al.,
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472	Cole, D.M., et al, [1985, p.166-170] MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devens, Massachusetts. Satterwhite, M.B., et al, [1976, 34p., CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al, [1977, 34p., CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al, [1978, 18p.] Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al, [1978, p.55-61] MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp. [1979, 75p.] Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al, [1979, 30p.] CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al, [1979, p.161-164] MP 1224	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1494 Preexing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., [1981, p.137-138] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] Using sea ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., [1982, p.2071-2074] MP 1821 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., [1982, 18p.] Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 19p.] Growth of black ice, snow ice and snow thickness, subscretches in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] MP 1893
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] MP 1486 Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982,	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 75-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Freah water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 73-18 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 73-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen sit as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly,	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1597 Heat flux Measuring building R-values for large areas. et al., (1981, p.137-138) MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8.5.) Using soa ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Aadreas, E.L., (1982, 185.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subarctic basins. Leppiranta, M., (1983, p.5-70) MP 2623 Preezing in a pipe with turbulent flow. Albert, M.R., et al.,
in Alaska. Kovacs, A., et al, [1979, p.268-279] Blectromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] Blectromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123]	Cole, D.M., et al. [1985, p.166-170] MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., [1976, 34p.] CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., [1978, 18p.] Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., [1978, p.55-61] MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., [1979, 75p.] SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., [1979, 30p.] CR 79-13 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., [1979, p.161-164] MP 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., [1980, p.109-119] MP 1451 Linearized Boussinesq groundwater flow equation. MP 1470	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1997 Heat flux Measuring building R-values for large areas. et al., (1981, p.137-138) MP 1398 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) Using sea ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) CR 82-12 Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subarctic basins. Lepptranta, M., (1983, p.59-70) MP 2643 Preezing in a pipe with turbulent flow. Albert, M.R., et al., (1983, p.102-112) Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.649-661) MP 1667 Toward in-situ building R-value measurement.
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] MP 1486 Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982,	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Freah water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al., (1979, p.161-164) Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.87-884) Relationship between the ice and unfrozen water phases in	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1997 Heat flax: Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1982, p.137-138) MP 1388 Using sea ice to measure vertical heat flux in the coean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subarctic basins. Lepptranta, M., (1983, p.59-70) MP 2043 Preezing in a pipe with turbulent flow. Albert, M.R., et al., (1983, p.102-112) Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.649-661) Toward in-situ building R-value measurement. S.N., et al., (1984, 13p.)
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Blectromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] Blectromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] MP 1512 Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] Blectrical properties of frozen ground, Point Barrow, Alaska.	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delts. Kovacs, A., et al., (1979, p.161-164) Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MF 1451 Linearized Boussiness groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) MP 1470 Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1597 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., [1981, p.137-138] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., [1982, 18p.] CR 82-12 Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 19p.] Growth of black ice, snow ice and snow thickness, subarctic basins. Lepptranta, M., [1983, p.59-70] MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, p.649-661] MP 1667 Toward in-situ building R-value measurement. CR 44-61 Measuring thermal performance of building envelopes: nine
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.655-6669] MP 1452 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soit-laden ice leases. Takagi, S., [1982, p.223-232; MP 1556 Electrical properties of frozen ground, Point Barrow, Alaska Arcone, S.A., et al, [1982, p.485-492) MP 1572	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen sitt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.87-884) Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) CR 82-41	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Freezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) Using soa ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subarctic basins. Leppiranta, M., (1983, p.59-70) MP 2643 Freezing in a pipe with turbulent flow. Albert, M.R., et al., (1983, p.102-112) Atmospheric dynamics in the antarctic marginali cannot continue the continuency of
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen siit as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] MP 1596 Electrical properties of frozen ground, Point Barrow, Alaska, Arcone, S.A., et al, [1982, p.485-492] Transport of water in frozen soil, Part 1. Nakano, Y., et al,	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) SR 78-07 Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) CR 82-41 Mathematical simulation of nitrogen interactions in soils.	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1597 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., [1981, p.137-138] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.137-138] MP 1598 Using sea ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., [1982, p.2071-2074] MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., [1982, 18p.] Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 19p.] Growth of black ice, snow ice and snow thickness, subscretic basins. Lepptranta, M., [1983, p.59-70] MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, 13p.] Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) Heat flow sensors on walle—what can we learn. S.N., [1985, p.140-149]
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.655-6669] MP 1452 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soit-laden ice leases. Takagi, S., [1982, p.223-232; MP 1556 Electrical properties of frozen ground, Point Barrow, Alaska Arcone, S.A., et al, [1982, p.485-492) MP 1572	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen sitt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.87-884) Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) CR 82-41	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1997 Heat flux Measuring building R-values for large areas. Flanders, S.N., MP 1383 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) Using sea ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Crowth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subscretch basins. Leppiranta, M., (1983, p.59-70) MP 2963 Preezing in a pipe with turbulent flow. Albert, M.R., et al., (1981, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.649-661) MP 1667 Toward in-situ building R-value measurement. S.N., et al., (1984, 13p.) Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) CR 83-491 Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) CR 84-91 Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) CR 84-91 Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) Regy exchange over antarctic sea ice in the spring. An-
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen siit as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., (1982, p.223-232) MP 1592 Electrical properties of frozen ground, Point Barrow, Alaska, Arcone, S.A., et al, [1982, p.485-492] MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.221-226] MP 1629 Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.15-26] MP 1601	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) SR 78-07 Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 3p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 1949,) CR 82-41 Mathematical simulation of nitrogen interactions in soils. Selim, H.M., et al., (1983, p.241-248) MP 2651 Calculation of advective mass transport in heterogeneous medis. Daly, C.J., (1983, p.73-89) MP 1697	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1597 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., [1981, p.137-138] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.137-138] MP 1598 Using sea ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., [1982, p.2071-2074] MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., [1982, 18p.] Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 19p.] Growth of black ice, snow ice and snow thickness, subscretic basins. Lepptranta, M., [1983, p.59-70] MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, 13p.] Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) Heat flow sensors on walle—what can we learn. S.N., [1985, p.140-149]
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1452 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] Electrical properties of frozen ground, Point Barrow, Alaska Arcone, S.A., et al, [1982, p.485-492] MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.221-226] Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.15-267] Relationship between ice and unifrozen water in frozen soils.	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., [1976, 34p.] CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Freah water supply for an Alaskan village. McFadden, T., et al., [1978, 18p.] SR 78-67 Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., [1978, p.55-61] MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., [1979, 75p.] Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., [1979, 30p.] CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al., [1979, p.161-164] MF 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., [1980, p.109-119] MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., [1981, p.875-884] MP 1451 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., [1982, 104p.] CR 82-41 Mathematical simulation of nitrogen interactions in soils. Selim, H.M., et al., [1982, 241-248] MP 2051 Calculation of advective mass transport in heterogeneous modis. Daly, C.J., [1983, p.73-89] MP 2051 Calculation of advective mass transport in heterogeneous modis. Daly, C.J., [1983, p.73-89] MP 1697 Field tests of a frost-heave model. Guymon, G.L., et al,	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., and P. 1382 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, p.137-138) Using sea ice to measure vertical beat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) CR 82-12 Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of faceted crystals in a snow cover. CR 82-12 Growth of faceted crystals in a snow chickness, subscretch basins. Leppiranta, M., (1983, p.59-70) MP 2963 Preezing in a pipe with turbulent flow. Albert, M.R., et al., (1981, p.102-112) Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.649-661) MP 1667 Toward in-situ building R-value measurement. S.N., et al., (1984, 13p.) CR 84-91 Measuring thermal performance of building envelopes: mire case studies. Flanders, S.N., (1985, 36p.) CR 85-97 Heat flow sensors on walls—what can we learn. S.N., et al., p.140-149; Snergy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1985, p.7199-7212] Heat lees Radiation and evaporation heat loss during ice fog conditions.
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1452 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] MP 1486 Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] MP 1536 Electrical properties of frozen ground, Point Barriow, Alaska, Arcone, S.A., et al, [1982, p.485-492] MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.21-226] Effects of ice on the water transport in frozen soil. MAP 1629 Effects of ice on the water transport in frozen soil. MAP 1631 Tice, A.R., et al, [1983, p.37-46] MP 1632	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Freah water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 73-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen sit as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) Relationable between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1983, p.241-248) MP 2651 Calculation of advective mass transport in hetrogeneous media. Daly, C.J., (1983, p.73-89) MP 1657 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) MP 1657	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1694 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1897 Heat flux Measuring building R-values for large areas. Planders, S.N., et al., [1981, p.137-138] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] MP 1888 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] MP 1888 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] MP 1888 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1984, 19p.] CR 82-12 Growth off, et al., [1982, 18p.] CR 82-12 Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 19p.] Growth of black ice, snow ice and snow thickness, substratic basins. Lepptranta, M., [1983, p.59-70] MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, 13p.] Measuring thermal performance of building envelopes: nine case studies. Planders, S.N., [1985, 36p.] CR 85-67 Heat flow sensors on walls—what can we learn. S.N., [1985, p.140-149] Energy exchange over antarctic sea ice in the spring. Ameres, E.L., et al., [1985, p.7199-7212] MP 2042 Reet loss Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1051
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.655-669] MP 1452 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232; Electrical properties of frozen ground, Point Barrow, Alaska Arcone, S.A., et al, [1982, p.285-492) MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1983, p.15-26] MP 1632 Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.15-26] MP 1632 Ground ice in perennially frozen sediments, northern Alaska Lawson, D.E., [1983, p.35-700) MP 1632	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen sit as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.87-884) MP 1470 Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) CR 82-41 Mathematical simulation of nitrogen interactions in soils. Selim, H.M., et al., (1983, p.241-248) MP 2051 Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-69) MP 1697 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) Investigation of transient processes in an advancing zone of freezing, McGaw, R., et al., (1983, p.221-825)	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1694 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) Using sea ice to measure vertical heat flux in the ocean. MCPhee, M.G., et al., (1982, p.2071-2074) MP 1821 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) CR 23-12 Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subarctic basins. Lepptranta, M., (1983, p.59-70) MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., (1983, p.102-112) Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., (1984, 13p.) Measuring thermal performance of building envelopes: in case studies. Flanders, S.N., (1985, 36p.) Heat flow sensors on walls—what can we learn. S.N., (1985, 196). (CR 85-67) Heat flow sensors on walls—what can we learn. S.N., (1985, p.199-7212) Energy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., (1985, p.7199-7212) Heat lees Radiation and evaporation beat loss during ice fog conditions. McFadden, T., (1975, p.18-27) Thermal energy and the environment. Crosby, R.L., et al., Thermal energy and the environment.
in Alaska. Kovaca, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] MP 1486 Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232) MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.221-226] Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.15-26] Relationship between ice and unfrozen water in frozen soil. Nakano, Y., et al, [1983, p.37-46] MP 1632 Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] Ice-cored mounds at Sukakpak Mountain, Brooks Range.	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 75-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Wiking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.87-884) MP 1470 Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) MR 1470 Calculation of advective mass transport in heterogeneous modia. Daly, C.J., (1983, p.73-89) MP 1697 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) MP 1657 Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., (1983, p.821-825) MP 1663	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1694 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., [1981, p.137-138] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.137-138] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.3] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.3] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.5] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1982, 199.] CR 28-12 Growth of heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., et al., [1982, 189.] CR 28-12 Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 199.] Growth of black ice, snow ice and snow thickness, subscretic basins. Lepptranta, M., [1983, p.59-70] MP 2063 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, 139.] Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) CR 28-97 Heat flow sensors on walls—what can we learn. S.N., (1985, p.140-149) Energy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1985, p.7199-7212] Heat less Radiation and evaporation heat loss during ice fog conditions. McFadden, T., (1975, p.18-27) Thermal energy and the environment. Crosby, R.L., et al., [1975, 39. + 2p. flgs.] Antarctic sea ice dynamics and its possible climatic effects.
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Blectromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Blectromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52) Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.232-232; MP 1572 Fransport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.221-226] Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.15-26] MP 1631 Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.59-700) MP 1653 MP 1653	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) SR 78-07 Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-13 Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al., (1979, p.161-164) MF 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) MP 1470 Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) CR 82-41 Mathematical simulation of nitrogen interactions in soils. Selim, H.M., et al., (1983, p.241-248) MP 2651 Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-89) Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., (1983, p.821-825) MP 1663 Procedure for calculating groundwater flow lines. Daly, C.J., J.	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1494 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) MP 1397 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) Using sea ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subscretce basins. Lepperanta, M., (1983, p.59-70) MP 2643 Preezing in a pipe with turbulent flow. Albert, M.R., et al., (1983, p.102-112) Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.649-661) MP 1667 Toward in-situ building R-value measurement. S.N., et al., (1984, 13p.) Measuring thermal performance of building envelopes: in case studies. Flanders, S.N., (1985, 36p.) Heat flow sensors on walls—what can we learn. S.N., et al., (1984, 13p.) Measuring thermal performance of building envelopes: in case studies. Flanders, S.N., (1985, 36p.) Heat flow sensors on walls—what can we learn. S.N., et al., (1984, 13p.) McFadden, T., (1975, p.18-27) MP 1889 Heat leas Radiation and evaporation heat loss during ice fog conditions. McFadden, T., (1975, p.18-27) Thermal energy and the environment. Crosby, R.L., et al., (1975, p.35-76) MP 1378
in Alaska. Kovaca, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., (1982, p.223-232) MP 1592 Electrical properties of frozen ground, Point Barrow, Alaska, Arcone, S.A., et al, [1982, p.485-492] MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.221-226] Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.15-26] MP 1632 Ground ice in perennially frozen sediments, northern Alaska, Lawson, D.E., [1983, p.695-700) MP 1653 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.894-898]	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) SR 78-07 Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 3p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1983, p.241-248) MP 2651 Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-89) MP 1697 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., (1983, p.821-825) MP 1663 Procedure for calculating groundwater flow lines. Daly, C.J., (1984, 42p.) Impact of slow-rate land treatment on groundwater quality:	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1694 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, p.137-138) Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, p.5) Using soa ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) CR 82-12 Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subarctic basins. Lepptranta, M., (1983, p.59-70) MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., (1983, p.102-112) Atmospheric dynamics in the antarctic marginal ice zona. Andreas, E.L., et al., (1984, p.649-661) MP 1667 Toward in-situ building R-value measurement. S.N., et al., (1984, 13p.) Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) CR 85-67, Heat flow sensors on walls—what can we learn. S.N., (1985, p.140-149) Energy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., (1985, p.7199-7212) MP 1889 Heat less Radiation and evaporation heat loss during ice fog conditions. McFadden, T., (1975, p.18-27) MP 1681 Thermal energy and the environment. Crosby, R.L., et al., (1975, p. 18-27) MP 1691 Thermal energy and the environment. Crosby, R.L., et al., (1975, p. 18-27) MP 1691 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al., (1976, p.53-76)
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Preshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-2232] Electrical properties of frozen ground, Point Barrow, Alaska Arcone, S.A., et al, [1982, p.485-492] Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.211-226] Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.15-26] MP 1629 Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.19-96] MP 1635 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1645	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Freah water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp, (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MF 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) MF 1450 Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) CR 82-41 Mathematical simulation of nitrogen interactions in soils. Selim, H.M., et al., (1983, p.241-248) MP 2051 Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-89) MP 1697 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) Investigation of transient processes in an advancing zone of freezing, McGaw, R., et al., (1983, p.821-825) MP 1657 Investigation of transient processes in an advancing zone of freezing, McGaw, R., et al., (1983, p.821-825) MP 1657 Investigation of granics. Parker, L.V., et al., (1984, 36p.) Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al., (1984, 36p.)	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1494 Freezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., [1981, p.137-138] Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.137-138] Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.137-138] Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.197-12074] MP 1521 Using soa ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., [1982, p.2071-2074] MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subscretic basins. Leppiranta, M., [1983, p.59-70] Freezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Amorapheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, p.649-661] Toward in-situ building R-value measurement. S.N., et al., [1984, 13p.] Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., [1985, 36p.] Heat flow sensors on walls—what can we learn. S.N., [1985, p.140-149] Benergy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1985, p.7199-7212] Heat loss Radiation and evaporation beat loss during ice fog conditions. McFadden, T., [1975, p.18-27] Thermal energy and the environment. Crosby, R.L., et al., (1975, 95, 97, 97, 97, 97, 97, 97, 97, 97, 97, 97
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 86-12 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1452 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] Electrical properties of frozen ground, Point Barrow, Alaska, Arcone, S.A., et al, [1982, p.485-492] MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.221-226] Effects of ice on the water transport in frozen soil. MP 1632 Ground ice in perennially frozen sediments, northern Alaska, Lawson, D.E., [1983, p.63-700) MP 1633 Ground ice in perennially frozen sediments, northern Alaska, Lawson, D.E., [1983, p.91-96] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.89-4898] MP 1665 Simple model of ice segregation using an analytic function to	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen sit as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) Relationable between the ice and unifrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1983, p.241-248) MP 2651 Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-89) MP 1697 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) MP 1657 Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., (1983, p.821-825) MP 1663 Procedure for calculating groundwater flow lines. Daly, C.J., (1984, 42p.) Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al., (1984, 36p.) CR 84-30	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1694 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1897 Heat flux Measuring building R-values for large areas. Planders, S.N., et al., [1981, p.137-138] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.] MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., et 1822, 185-1 Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 195-1] Growth of black ice, snow ice and snow thickness, subscretic basins. Lepptranta, M., [1983, p.59-70] MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, 13p-] Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., [1985, 36p-] CR 84-61 Toward in-situ building R-value measurement. S.N., [1985, p.140-149] Beergy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1976, p.7199-7212] Heat flow sensors on walls—what can we learn. S.N., [1985, p.140-149] Beergy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1975, p.18-27] MP 1081 Thermal energy and the environment. Crosby, R.L., et al., [1975, 3p. + 2p. flgs.] Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al., [1976, p.53-76] Detecting structural heat losses with mobile infrared thermography, Part IV. Munis, R.H., et al., [1976, 9p.] Computer derived heat requirements for buildings in cold
in Alaska. Kovacs, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Preshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-2232] Electrical properties of frozen ground, Point Barrow, Alaska Arcone, S.A., et al, [1982, p.485-492] Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.211-226] Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.15-26] MP 1629 Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.19-96] MP 1635 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1645	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Freah water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp, (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MF 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) MF 1450 Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) CR 82-41 Mathematical simulation of nitrogen interactions in soils. Selim, H.M., et al., (1983, p.241-248) MP 2051 Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-89) MP 1697 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) Investigation of transient processes in an advancing zone of freezing, McGaw, R., et al., (1983, p.821-825) MP 1657 Investigation of transient processes in an advancing zone of freezing, McGaw, R., et al., (1983, p.821-825) MP 1657 Investigation of granics. Parker, L.V., et al., (1984, 36p.) Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al., (1984, 36p.)	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1694 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1997 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) MP 1398 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] Using sea ice to measure vertical heat flux in the ocean McPhee, M.G., et al., [1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) CR 22-12 Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 19p.] Growth of black ice, snow ice and snow thickness, subarctic basins. Lepptranta, M., (1983, p.59-70) MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1984, 13p.] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, p.649-661] MP 1697 Toward in-situ building R-value measurement. S.N., et al., [1984, 13p.] Measuring thermal performance of building envelopes: incase studies. Flanders, S.N., (1985, 36p.) Heat flow sensors on walls—what can we learn. S.N., [1985, p.160-149) MP 2604 Energy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1985, p.7199-7212] MP 1891 Heat lees Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] Thermal energy and the environment. Crosby, R.L., et al., (1975, 3p. + 2p. flgs.) Antarcic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al., (1976, p.53-76) MP 1378 Detecting structural heat losses with mobile infrared thermography, Part IV. Munis, R.H., et al., (1976, 9p.) Computer derived heat requirements for buildings in cold regions. Bennett, F.L., (1977, 113p.) SR 77-63
in Alaska. Kovaca, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] MP 1486 Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.221-226] Effects of ice on the water transport in frozen soil. MP 1632 Ground ice in perennially frozen sedimenta, northern Alaska, Lawson, D.E., [1983, p.37-46] MP 1633 Ground ice in perennially frozen sedimenta, northern Alaska, Lawson, D.E., [1983, p.91-96] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1653 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1654 Crowded the stand soil-water flow. Hromadka, T.V., II, et al, [1984, p.99-104)	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 75-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Wiking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 73-18 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 73-15 Preshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen sit as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) MP 1479 Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) MP 1677 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., (1983, p.821-825) MP 1663 Procedure for calculating groundwater flow lines. Daly, C.J., (1984, 42p.) Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al., (1984, 36p.) CR 84-30 Polyvinyl chloride pipes and ground water chemistry. Park- er, L.V., et al., (1985, 27p.) GR 82-12 Grounded toe	Heat balance Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1694 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1897 Heat flux Measuring building R-values for large areas. Planders, S.N., et al., [1981, p.137-138] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.] MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.] MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., et 1822, 185-1 Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 195-1] Growth of black ice, snow ice and snow thickness, subscretic basins. Lepptranta, M., [1983, p.59-70] MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, 13p-] Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., [1985, 36p-] CR 84-61 Toward in-situ building R-value measurement. S.N., [1985, p.140-149] Beergy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1976, p.7199-7212] Heat flow sensors on walls—what can we learn. S.N., [1985, p.140-149] Beergy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1975, p.18-27] MP 1081 Thermal energy and the environment. Crosby, R.L., et al., [1975, 3p. + 2p. flgs.] Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al., [1976, p.53-76] Detecting structural heat losses with mobile infrared thermography, Part IV. Munis, R.H., et al., [1976, 9p.] Computer derived heat requirements for buildings in cold
in Alaska. Kovaca, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Preshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1456 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] Electrical properties of frozen ground, Point Barrow, Alaska Arcone, S.A., et al, [1982, p.485-492] Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.221-226] Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.15-26] MP 1639 Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.19-96] MP 1631 Ground ice in perennially frozen sediments, northern Alaska Lawson, D.E., [1983, p.91-96] MP 1653 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.99-86-898] MP 1665 Simple model of ice segregation using an analytic function to model heat and soil-water flow. Hromadka, T.V., II, et al, [1984, p.99-104]	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., [1976, 34p.] CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., [1978, 18p.] SR 78-67 Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., [1978, p.55-61] MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., [1979, 75p.] Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., [1979, 30p.] CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al., [1979, p.161-164] MF 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., [1980, p.109-119] MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., [1981, p.875-884] RP 1451 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., [1982, 104p.] CR 82-41 Mathematical simulation of nitrogen intersections in soils. Selim, H.M., et al., [1983, p.73-89] MP 2051 Calculation of advective mass transport in heterogeneous media. Daly, C.J., [1983, p.73-89] MP 2051 Calculation of advective mass transport in heterogeneous media. Daly, C.J., [1983, p.73-89] MP 1657 Pield tests of a frost-heave model. Guymon, G.L., et al., [1983, p.40-414] Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., [1983, p.821-825) MP 1663 Procedure for calculating groundwater flow lines. Daly, C.J., [1984, 42p.] Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Polyvinyl chloride pipes and ground water chemistry. Parker, L.V., et al., [1984, 36p.]	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1694 Freezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, p.137-138) MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, p.137-138) MP 1821 Using soa ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subscretic basins. Leppfranta, M., (1983, p.59-70) MP 2643 Preezing in a pipe with turbulent flow. Albert, M.R., et al., (1984, p.102-112) Atmospheric dynamics in the antarctic marginali ice zone. Andreas, E.L., et al., (1984, p.649-661) Toward in-situ building R-value measurement. S.N., et al., (1984, 13p.) Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) Heat flow sensors on walls—what can we learn. S.N., (1985, p.140-149) Heat flow sensors on walls—what can we learn. S.N., (1985, p.140-149) Benergy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., (1985, p.7199-7212) Heat loss Radiation and evaporation beat loss during ice fog conditions. McFadden, T., (1975, p.18-27) Thermal energy and the environment. Crosby, R.L., et al., (1975, 95, 95, 97, 97, 97, 97, 97, 97, 97, 97, 97, 97
in Alaska. Kovaca, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al, [1979, p.161-164] MP 1224 Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] MP 1486 Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.221-226] Effects of ice on the water transport in frozen soil. MP 1632 Ground ice in perennially frozen sedimenta, northern Alaska, Lawson, D.E., [1983, p.37-46] MP 1633 Ground ice in perennially frozen sedimenta, northern Alaska, Lawson, D.E., [1983, p.91-96] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1653 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1654 Crowded the stand soil-water flow. Hromadka, T.V., II, et al, [1984, p.99-104)	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen sit as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) MP 1470 Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1982, 104p.) CR 82-41 Mathematical simulation of nitrogen interactions in soils. Selim, H.M., et al., (1983, p.241-248) MP 2051 Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-89) MP 1697 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., (1983, p.821-825) MP 1657 Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., (1984, 36p.) CR 84-30 Polyvinyi chloride pipes and ground water chemistry. Park- er, L.V., et al., (1985, 27p.) CR 84-30 Polyvinyi chloride pipes and ground water chemistry. Park- er, L.V., et al., (1985, 27p.) CR 84-30 Polyvinyi chloride pipes and ground water chemistry. Park- er, L.V., et al., (1985, 27p.)	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1694 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1897 Heat flux Measuring building R-values for large areas. Planders, S.N., et al., [1981, p.137-138] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.137-138] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1982, 19p.] Growth of heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., et 1892, 18p.] Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 19p.] Growth of black ice, snow ice and snow thickness, subscretic basins. Lepptranta, M., [1983, p.59-70] MP 2663 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, 13p.] Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., [1985, 36p.] CR 85-47 Heat flow sensors on walls—what can we learn. S.N., [1985, p.140-149] Beergy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1976, p.79-7212] MP 1899 Heat lees Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1891 Heat lees Radiation and evaporation beat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1891 Detecting structural heat losses with mobile infrared thermography, Part IV. Munis, R.H., et al., [1976, 9p.] CR 76-33 Computer derived heat requirements for buildings in coid regions. Bennett, F.L., [1977, 113p.] CR 77-13 Cherration and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-11 Reinsu
in Alaska. Kovaca, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Preshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al, [1979, p.161-164] Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.655-669] MP 1452 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232; Electrical properties of frozen ground, Point Barrow, Alaska Arcone, S.A., et al, [1982, p.485-492] MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1983, p.15-6] Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.19-96] MP 1633 Ground ice in perennially frozen sediments, northern Alaska Lawson, D.E., [1983, p.91-96] MP 1653 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.91-96] MP 1655 Simple model of ice segregation using an analytic function to model heat and soil-water flow. Hromadka, T.V., II, et al, [1984, p.99-104] Two-dimensional model of coupled heat and moisture transport in frost heaving soils. Guymon, G.L., et al, [1984, p.91-98] Effects of ice content on the transport of water in frozen soil proven sing frozen soils. Only the force of the content on the transport of water in frozen port in frozen soils. Nakano, Y., et al, [1984, p.28-34]	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 76-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Freah water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Freshwater pool radar-detected near an Alaskan river delta. Kovacs, A., et al., (1979, p.161-164) MRP 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-41 Mathematical simulation of nitrogen interactions in soils. Selim, H.M., et al., (1983, p.73-89) MP 2051 Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-89) MP 1697 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., (1983, p.81-825) MP 1663 Procedure for calculating groundwater flow lines. Daly, C.J., (1984, 42p.) Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al., (1984, 36p.) CR 84-30 Polyvinyl chloride pipes and ground water chemistry. Parker, L.V., et al., (1971, 46 leaves) Islands of grounded ice. Kovacs, A., et al., (1975, p.213	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., (1981, p.76-81) MP 1694 Freezing and thawing: heat balance integral approximations. Lunardini, V.J., (1983, p.30-37) MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., (1981, p.137-138) MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, p.137-138) MP 1388 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, p.137-138) MP 1821 Using soa ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., (1982, p.2071-2074) MP 1521 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) Growth of faceted crystals in a snow cover. Colbeck, S.C., (1982, 19p.) Growth of black ice, snow ice and snow thickness, subscretic basins. Leppfranta, M., (1983, p.59-70) MP 2643 Preezing in a pipe with turbulent flow. Albert, M.R., et al., (1984, p.102-112) Atmospheric dynamics in the antarctic marginali ice zone. Andreas, E.L., et al., (1984, p.649-661) Toward in-situ building R-value measurement. S.N., et al., (1984, 13p.) Measuring thermal performance of building envelopes: nine case studies. Flanders, S.N., (1985, 36p.) Heat flow sensors on walls—what can we learn. S.N., (1985, p.140-149) Heat flow sensors on walls—what can we learn. S.N., (1985, p.140-149) Benergy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., (1985, p.7199-7212) Heat loss Radiation and evaporation beat loss during ice fog conditions. McFadden, T., (1975, p.18-27) Thermal energy and the environment. Crosby, R.L., et al., (1975, 95, 95, 97, 97, 97, 97, 97, 97, 97, 97, 97, 97
in Alaska. Kovaca, A., et al, [1979, p.268-279] MP 1175 Electromagnetic survey in permafrost. Sellmann, P.V., et al, [1979, 7p.] Freshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al, [1979, p.161-164] Electromagnetic surveys of permafrost. Arcone, S.A., et al, [1979, 24p.] CR 79-23 Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.] SR 80-12 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al, [1980, p.109-119] MP 1451 Numerical solutions for rigid-ice model of secondary frost heave. O'Neill, K., et al, [1980, p.656-669] MP 1454 Comparative evaluation of frost-susceptibility tests. Chamberlain, E.J., [1981, p.42-52] MP 1454 Distortion of model subsurface radar pulses in complex dielectrics. Arcone, S.A., (1981, p.855-864) MP 1472 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] MP 1596 Electrical properties of frozen ground, Point Barrow, Alaska, Arcone, S.A., et al, [1982, p.485-492] MP 1572 Transport of water in frozen soil, Part 1. Nakano, Y., et al, [1982, p.21-226] Effects of ice on the water transport in frozen soil. Nakano, Y., et al, [1983, p.37-46] MP 1601 Relationship between ice and unfrozen water in frozen soil. Nakano, D.E., (1983, p.39-4-69) MP 1632 Ground ice in perennially frozen sedimenta, northern Alaska, Lawson, D.E., (1983, p.395-700) MP 1653 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, (1983, p.394-888) MP 1653 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, (1983, p.394-888) MP 1653 Electrical properties of force of coupled heat and moisture transport in frost heaving soils. Guymon, G.L., et al, (1984, p.91-98) MP 1678 Effects of ice content on the transport of water in frozen soils.	Cole, D.M., et al. (1985, p.166-170) MP 2068 Ground water Rapid infiltration of primary sewage effluent at Fort Devena, Massachusetts. Satterwhite, M.B., et al., (1976, 34p.) CR 75-48 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Fresh water supply for an Alaskan village. McFadden, T., et al., (1978, 18p.) SR 78-97 Viking GCMS analysis of water in the Martian regolith. Anderson, D.M., et al., (1978, p.55-61) MF 1195 Bibliography on techniques of water detection in cold regions. Smith, D.W., comp., (1979, 75p.) SR 79-10 Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al., (1979, 30p.) CR 79-15 Preshwater pool radar-detected near an Alaskan river delta. Kovaca, A., et al., (1979, p.161-164) MP 1224 Strength of frozen silt as a function of ice content and dry unit weight. Sayles, F.H., et al., (1980, p.109-119) MP 1451 Linearized Boussinesq groundwater flow equation. Daly, C.J., et al., (1981, p.875-884) Relationship between the ice and unfrozen water phases in frozen soil. Tice, A.R., et al., (1982, 8p.) CR 82-15 Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., (1983, p.241-248) MP 1677 Field tests of a frost-heave model. Guymon, G.L., et al., (1983, p.409-414) MP 1687 Investigation of transient processes in an advancing zone of freezing. McGaw, R., et al., (1983, p.821-825) MP 1663 Procedure for calculating groundwater flow lines. Daly, C.J., (1984, 42p.) Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al., (1984, 36p.) Created ice Investigation of ice islands in Babbage Bight. Kovaca, A., et al., (1971, del issues) Islands of grounded ice. Kovaca, A., et al., (1975, p.213-	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al., [1981, p.76-81] MP 1694 Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1897 Heat flux Measuring building R-values for large areas. Flanders, S.N., et al., [1981, p.137-138] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.137-138] MP 1898 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, p.2] Using sea ice to measure vertical heat flux in the ocean. McPhee, M.G., et al., [1982, p.2071-2074] MP 1821 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., [1982, 189.] CR 23-12 Growth of faceted crystals in a snow cover. Colbect, S.C., [1982, 199.] Growth of black ice, snow ice and snow thickness, substratic basins. Lepptranta, M., [1983, p.59-70] MP 2643 Preezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al., [1984, p.649-661] MP 1667 Toward in-situ building R-value measurement. S.N., et al., [1984, 139.] Measuring thermal performance of building envelopes: incase studies. Flanders, S.N., (1985, 36p.) CR 85-67 Heat flow sensors on walls—what can we learn. S.N., [1985, p.140-149] MP 1667 MP 2642 Energy exchange over antarctic sea ice in the spring. Andreas, E.L., et al., [1975, p.18-27] Thermal energy and the environment. Crosby, R.L., et al., [1975, 3p. + 2p. flgs.] Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.P., et al., [1976, p.53-76] MP 1637 Detecting structural heat losses with mobile infrared thermography, Part IV. Munis, R.H., et al., [1976, 9p.] CR 77-53 Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-83 Observation and analysis of protected membrane roofing systems. Schaefer, D., et al., [1977, 40p.] CR 77-11 Reinsulating old wood frame buildings with urse-formalde-hyde foam. Tobiasson, W., et al., [1977, p.478-487]

Infrared thermography of buildings. Munis, R.H., et al. [1977, 17p.] SR 77-29	Suppression of river ice by thermal effluents. Ashton, G.D., (1979, 23p.) CR 79-39	Status of numerical models for heat and mass transfer in frost- susceptible soils. Berg, R.L., (1984, p.67-71)
Infrared thermography of buildings. Munis, R.H., et al, [1977, 21p.] SR 77-26	Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 80-68	MP 1851 Dynamics of frazil ice formation. Duly, S.F., et al, (1984,
Thermal scanning systems for detecting building heat loss. Grot, R.A., et al, [1978, p.B71-B90] MP 1212	Mathematical model to correlate frost heave of pavements. Berg, R.L., et al. (1980, 49p.) CR 88-10	p.161-172 ₁ MP 1829 Frazil ice formation. Ettema, R., et al, [1984, 44p.] CR 84-18
Infrared thermography of buildings—a bibliography with abstracts. Marshall, S.J., [1979, 67p.] SR 79-01	Adsorption force theory of frost heaving. Takagi, S., 1980, p.57-81, MP 1334	CR 84-18 lee bands in turbulent pipe flow. Ashton, G.D., [1984,
Infrared thermography of buildings: 1977 Coast Guard survey. Marshall, S.J., [1979, 40p.] SR 79-20	Prost heave model based upon heat and water flux. Guy- mon, G.L., et al, [1980, p.253-262] MP 1333	7p.; MP 2067 Heat and moisture transfer in frost-heaving soils. Guymon,
Losses from the Fort Wainwright heat distribution system.	Thermodynamics of snow metamorphism due to variations in	G.L., et al, [1984, p.336-343] MP 1765
Photteplace, G., et al, [1981, 29p.] SR 81-14 Transient analysis of heat transmission systems. Photte-	curvature. Colbeck, S.C., [1980, p.291-301] MP 1368	Ice deterioration. Ashton, G.D., [1984, p.31-38] MP 1791
place, G., [1981, 53p.] CR 81-24 Heat loss from the central heat distribution system, Fort	Pree convection heat transfer characteristics in a melt water layer. Yen, YC., [1980, p.550-556] MIP 1311	Laboratory tests and analysis of thermosyphons with inclined evaporator sections. Zarling, J.P., et al., [1985, p.31-37]
Wainwright. Phetteplace, G.E., [1982, 20p.] MP 1980	Heat and mass transfer from freely falling drops at low temperatures. Zarling, J.P., (1980, 14p.) CR 88-18	MP 1853 Thermal convection in snow. Powers, D.J., et al. [1985]
Heat and moisture advection over antarctic sea ice. Andreas, E.L., 1985, p.736-746; MP 1888	Thermal diffusivity of frozen soil. Haynes, F.D., et al, [1980, 30p.] SR 98-38	61p. ₁ CR 85-09 Heat flow sensors on walls—what can we learn. Flanders,
Heat pipes Application of heat pipes on the Trans-Alaska Pipeline.	Phase change around a circular pipe. Lunardini, V.J., [1980, 18p.] CR 86-27	S.N., [1985, p.140-149] MP 2042 Experiments on thermal convection in snow. Powers, D., et
Heuer, C.B., [1979, 27p.] SR 79-26 Computer models for two-dimensional transient heat conduc-	Estimation of heat and mass fluxes over Arctic leads. Andreas, E.L., [1980, p.2057-2063] MIP 1410	al, (1985, p.43-47) MP 2606 Partial verification of a thaw settlement model. Guymon,
tion. Albert, M.R., [1983, 66p.] CR 83-12	Heat transfer in cold climates. Lunardini, V.J., 1981, 731p.; MP 1435	G.L., et al, [1985, p.18-25] MP 1924 Measured and expected R-values of 19 building envelopes.
Waste heat recovery for building heating. Sector, P.W.,	Results from a mathematical model of frost heave. Guymon, G.L., et al, [1981, p.2-6] MP 1483	Flanders, S.N., [1985, p.49-57] MP 2113 Review of analytical methods for ground thermal regime cal-
[1977, 24p.] SR 77-11 Heat recovery	Phase change around a circular cylinder. Lunardini, V.J., [1981, p.598-600] MP 1567	culations. Lunardini, V.J., [1985, p.204-257] MP 1922
Management of power plant waste heat in cold regions. Asmot, H.W.C., (1975, p.22-24) MP 942	Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, Sp.] SR 81-18	Model of freezing front movement. Hromadka, T.V., II, et
Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] MP 893	Phase change around insulated buried pipes: quasi-steady	Heat transfer characteristics of thermosyphons with inclined
Ice engineering facility heated with a central heat pump sys- tem. Aamot, H.W.C., et al, (1977, 4p.) MP 939	method. Lunardini, V.J., [1981, p.201-207] MP 1496	evaporator sections. Haynes, F.D., et al, [1986, p.285- 292] MP 2034
Waste heat recovery for building heating. Sector, P.W., (1977, 24p.)	Ice segregation in a frozen soil column. Guymon, G.L., et al, [1981, p.127-140] MP 1534	Heat transfer in water over a melting ice sheet. Lunardini, V.J., [1986, p.227-236] MP 2833
Experimental scaling study of an annular flow ice-water heat	Heat conduction with phase changes. Lunardini, V.J., [1981, 14p.] CR 81-25	Heat transfer in water flowing over a horizontal ice sheet. Lunardini, V.J., et al, [1986, 81p.] CR 86-03
Waste heat recovery for heating purposes. Phetteplace, G.,	One-dimensional transport from a highly concentrated, transfer type source. O'Neill, K., [1982, p.27-36]	Introduction to heat tracing. Henry, K., [1986, 20p.] TD 86-01
[1978, p.30-33] MP 1256 Design procedures for underground heat sink systems. Stub-	MP 1489 On the temperature distribution in an air-ventilated anow lay-	Heat transfer coefficient Heat transfer between water jets and ice blocks. Yen, YC.,
stad, J.M., et al, [1979, 186p. in var. pagnal] SR 79-08	er. Yen, YC., [1982, 10p.] CR 82-65 Theory of thermal control and prevention of ice in rivers and	[1976, p.299-307] MP 882 Heat transmission
Waste heat utilization through soil heating. McFadden, T., et al, [1980, p.105-120] MP 1363	lakes. Ashton, G.D., [1982, p.131-185] MP 1554 Freezing of soil with surface convection. Lunardini, V.J.,	Long distance heat transmission with steam and hot water.
Heat pumps to recover heat from waste treatment plants. Martel, C.J., et al, (1982, 23p.) SR 82-10	[1982, p.205-212] MP 1595 Ottauquechee River—analysis of freeze-up processes. Cal-	Aamot, H.W.C., et al, [1976, 39p.] MP 938 Heat transmission with steam and hot water. Aamot,
Heat recovery from primary effluent using heat pumps. Phetteplace, G.E., et al, [1985, p.199-203] MP 1978	kins, D.J., et al, [1982, p.2-37] MP 1738	H.W.C., et al. (1978, p.17-23) MP 1956 Heat loss from the central heat distribution system, Fort
Heat staks	Prost heave model. Hromadka, T.V., II, et al, [1982, p.1-10] MP 1567	Wainwright. Phetteplace, G.B., [1982, 20p.]
Pleases secondaries for underground heat sink sustains. Stuk.		MP 1980
Design procedures for underground heat sink systems. Stub- stad, J.M., et al, {1979, 186p. in var. pagns.]	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] MP 1384	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456]
stad, 3.M., et al, {1979, 186p. in var. pagns.; SR 79-08 Host sources	Solution of two-dimensional freezing and thawing problems. O'Neill, K., 1983, p.653-658, MP 1384 Freezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., (1983, p.649-652;	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping.
stad, J.M., et al, (1979, 186p. in var. pagms.) SR 79-08 Heat sources Thermal energy and the environment. Crosby, R.L., et al, (1975, 3p. + 2p. figs.) MP 1480	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] MP 1884 Preezing of semi-infinite medium with initial temerature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cyl-	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979
stad, J.M., et al, [1979, 186p. in var. pagna.] SR 79-08 Heat sources Thermal energy and the environment. Crosby, R.L., et al, [1975, 3p. + 2p. figa.] Waste heat utilization through soil heating. McFadden, T., et al, [1980, p.105-120] MP 1363	Solution of two-dimensional freezing and thawing problems. O'Neill, K., (1983, p.653-658) Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., (1983, p.649-652) MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., (1983, p.25-32) MP 1993 Approximate solution to conduction freezing with density	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. As-
stad, J.M., et al., [1979, 186p. in var. pagna.] SR 79-68 Heat sources Thermal energy and the environment. Crosby, R.L., et al., [1975, 3p. + 2p. figs.] Waste heat utilization through soil heating. MCFadden, T., et al., [1980, p.105-120] Heat transfer Formation of ice ripples on the underside of river ice covers.	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] MP 1884 Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] MP 1993 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] MP 1996 Computer models for two-dimensional transient heat conduc-	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and
stad, J.M., et al, {1979, 186p. in var. pagna.} Heat sources Thermal energy and the environment. Crosby, R.L., et al, {1975, 3p. + 2p. figs.} MP 1480 Waste heat utilization through soil heating. McFadden, T., et al, {1980, p.105-120} MP 1363 Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., {1971, 157p.} MP 1243	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] MP 1884 Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] MP 1893 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] MP 1898	Simplified design procedures for heat transmission system piping. Phetterplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetterplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Aamot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al, [1976, 121p.] SR 76-16
stad, J.M., et al., {1979, 186p. in var. pagna.} SR 79-68 Heat sources Thermal energy and the environment. Crosby, R.L., et al., {1975, 3p. + 2p. figa.} Waste heat utilization through soil heating. MCradden, T., et al., {1980, p.105-120} Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., {1971, 157p.} Heat transfer in drill holes in Antarctic ice. al., {1976, 15p.} Yen, YC., et al., {1976, 15p.}	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] Predicting lake ice decay. Ashton, G.D., [1983, p8.3-19 SR 83-19	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Aamot, H.W.C., (1975, p.22-24) Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] SR 76-17
stad, J.M., et al. (1979, 186p. in var. pagna.) Heat sources Thermal energy and the environment. Crosby, R.L., et al. (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al. (1980, p.105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) Heat transfer in drill holes in Antarctic ice. al. (1976, 15p.) Numerical simulation of air bubbler systems. (1977, p.765-778) Ashton, G.D., MP 936	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] MP 1884 Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] MP 1893 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] MP 1896 Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] Predicting lake ice decay. Ashton, G.D., [1983, 4p.] Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] MP 1662	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 3p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] MP 893
stad, J.M., et al, {1979, 186p. in var. pagna.} Heat sources Thermal energy and the environment. Crosby, R.L., et al, {1975, 3p. + 2p. figs.} MP 1480 Waste heat utilization through soil heating. MCFadden, T., et al, {1980, p.105-120} MP 1363 Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., {1971, 157p.} MP 1243 Heat transfer in drill holes in Antarctic ice. al, {1976, 15p.} Numerical simulation of air bubbler systems. (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Stuberad, J.M., et al, {1977, 54p.} CR 77-15	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1583 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] MP 1593 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 661,] Predicting lake ice decay. Ashton, G.D., [1983, 4p.] Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. et al., [1983, p.240-243] MP 1742	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. As mot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Asmot, H.W.C., et al, [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Ice engineering complex adopts heat pump energy system. Asmot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03
stad, J.M., et al, {1979, 186p. in var. pagna.} Heat sources Thermal energy and the environment. Crosby, R.L., et al, (1975, 3p. + 2p. figa.) Waste heat utilization through soil heating. MCFadden, T., et al, (1980, p.105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., {1971, 157p.} Heat transfer in drill holes in Antarctic ice. al, (1976, 15p.) Numerical simulation of air bubbler systems. (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al, (1977, 54p.) Mathematical model to predict frost heave. [1977, p.92-109] MP 1331	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-23] Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.34-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] Predicting lake ice decay. Ashton, G.D., [1983, 4p.] Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. Fish, A.M., MP 1742 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] SR 83-22	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Aamot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 Ice engineering facility heated with a central heat pump yet tem. Aamot, H.W.C., et al., [1977, 4p.] MP 939
stad, J.M., et al., [1979, 186p. in var. pagna.] Heat sources Thermal energy and the environment. Crosby, R.L., et al., [1975, 3p. + 2p. figs.] Waste heat utilization through soil heating. McFadden, T., et al., [1980, p.105-120] Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] Heat transfer in drill holes in Antarctic ice. MP 1243 Heat transfer in drill holes in Antarctic ice. CR 76-12 Numerical simulation of air bubbler systems. (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] Mp 236 Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] Mp 1131 Maintaining buildings in the Arctic. Tobiasson, W., et al., [1977, p.244-251]	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] MP 1993 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] MP 1662 Thermal patterns in ice under dynamic loading, et al., [1983, p.240-243] Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Freezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112]	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., c[1975, p.22-24, MP 942 Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 3p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] MP 893 Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 Ice engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 4p.] Waste heat recovery for building heating. Sector, P.W., [1977, 24p.] SR 77-11
Heat sources Thermal energy and the environment. Crosby, R.L., et al. (1973, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al. (1980, p. 105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, C.D., (1971, 157p.) MP 1343 Heat transfer in drill holes in Antarctic ice. al. (1976, 15p.) Numerical simulation of air bubbler systems. (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) MP 1336 MRP 1336 Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p.244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, 12p.) CR 77-32	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-22] MP 1893 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 661,] Predicting lake ice decay. Ashton, G.D., [1983, 4p., CR 83-12] Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading, et al, [1983, p.750-755] Thermal patterns in ice under dynamic loading, et al, [1983, p.240-243] Fish, A.M., MP 1742 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.,] Freezing in a pipe with turbulent flow. Albert, M.R., et al, (1983, p.102-112) Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229)	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al, [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 Ice engineering facility heated with a central heat pump system. Aamot, H.W.C., et al, [1977, 4p.) MP 939 Waste heat recovery for building heating. Sector, F.W.,
Heat sources Thermal energy and the environment. Crosby, R.L., et al., (1973, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p. 105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) Heat transfer in drill holes in Antarctic ice. 1, (1976, 15p.) Numerical simulation of air bubbler systems. MP 1243 Heat practical simulation of air bubbler systems. MP 1243 Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) MR 1303 Minimaining buildings in the Arctic. Tobiasson, W., et al., (1977, p.24-4-251) Heat transfer over a vertical melting plate. Ven., YC., et al., (1977, 12p.) Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., (1978, p.615-621) MP 1302	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1583 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-23] MP 1593 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 661-3] Predicting lake ice decay. Ashton, G.D., [1983, 4p.] Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. et al., [1983, p.240-243] Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Freezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] MP 1693 Fixed mesh finite element solution for cartesian two-dimen-	Simplified design procedures for heat transmission system piping. Phetterplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetterplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] loe engineering complex adopts heat pump energy system. Aamot, H.W.C., (1977, p.25-26) Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 loe engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 4p.] Waste heat recovery for building heating. Sector, P.W., [1977, 24p.] Solving problems of ice-blocked drainage facilities. Carey,
Heat sources Thermal energy and the environment. Crosby, R.L., et al. (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al. (1980, p. 105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) Heat transfer in drill holes in Antarctic ice. MP 1243 Heat transfer in drill holes in Antarctic ice. CR 76-12 Numerical simulation of air bubbler systems. (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., (1977, 54p.) MP 1393 Maintaining buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) Mathematical model to predict frost heave. Berg. R.L., et al., (1977, p.244-251) MP 1394 Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, 12p.) Permafrost and active layer on a northern Alaskan road.	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-23] Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.34-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] CR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. et al., [1983, p.240-243] Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] SR 83-22 Freezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] MP 1693 Fixed mesh finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] MP 1762	Simplified design procedures for heat transmission system piping. Phetterplace, G.B., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetterplace, G.B., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Aamot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 3p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 Waste heat recovery for building heating. Sector, P.W., [1977, 24p.] Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 17p.] Temporary protection of winter construction. Bennett, F.L.,
Heat sources Thermal energy and the environment. Crosby, R.L., et al., (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p. 105-120) MP 1363 Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) MP 1243 Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., (1976, 15p.) Numerical simulation of air bubbler systems. Ashton, G.D., (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) MR 1303 Minimatining buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, 12p.) CR 77-32 Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., (1978, p.615-621) Numerical simulation of air bubbler systems. Ashton, G.D., (1978, p.231-238) Fundamentals of ice lens formation. Takagi, S., (1978,	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading, et al, [1983, p.240-243] Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Freezing in a pipe with turbulent flow. Albert, M.R., et al, (1983, p.102-112) Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] Fixed meah finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] MP 1792 West antarctic sea ice. Ackley, S.F., [1984, p.88-95] MP 1818	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Amp 942 Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 Ice engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 11] Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 17p.] SR 77-25 Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] SR 77-39 Waste heat recovery for heating purposes. Phetteplace, G., MP 1256 Deicing a satellite communication antenna. Hanamoto, B.,
Heat sources Thermal energy and the environment. Crosby, R.L., et al. (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al. (1980, p. 105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) Heat transfer in drill holes in Antarctic ice. MP 1243 Heat transfer in drill holes in Antarctic ice. CR 76-12 Numerical simulation of air bubbler systems. (1977, p. 765-778) Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., (1977, 34p.) MP 1936 Mathematical model to predict frost heave. Berg, R.L., et al., (1977, p. 244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, 12p.) Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., (1978, p.615-621) MP 1102 Numerical simulation of air bubbler systems. Apl 1102 Numerical simulation of air bubbler systems. (1978, p.231-238) MP 1618 Fundamentals of ice lens formation. Takagi, S., (1978, p.235-242) MP 1103 MP 1173 Heat and moisture flow in unsaturated soils. O'Neill, K.,	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] MP 1993 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] Predicting lake ice decay. Ashton, G.D., [1983, 4p.] Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. Fish, A.M., MP 1742 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Freezing in a pipe with turbulent flow. Albert, M.R., et al., (1983, p.102-112) Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] Fixed mesh finite element solution for cartesiant wo-dimensional phase change. O'Neill, K., [1983, p.436-441] West antarctic sea ice. Ackley, S.F., [1984, p.88-95] MP 1893 Two-dimensional model of coupled heat and moisture transport in frost heaving soils. Guymon, G.L., et al., [1984,	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] loe engineering complex adopts heat pump energy system. Aamot, H.W.C., (1977, p.25-26) Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 loe engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 4p.] Waste heat recovery for building heating. [1977, 24p.] Swate heat recovery for heating purposes. [1977, 41p.] Waste heat recovery for heating purposes. [1977, 919-30-33] Deicing a satellite communication antenna. et al., [1980, 14p.] Waste heat utilization through soil heating. MCPadden, T.,
Heat sources Thermal energy and the environment. Crosby, R.L., et al. (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al. (1980, p. 105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) Heat transfer in drill holes in Antarctic ice. MP 1243 Heat transfer in drill holes in Antarctic ice. CR 76-12 Numerical simulation of air bubbler systems. (1977, p. 765-778) Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., (1977, 54p.) MF 133 Maintaining buildings in the Arctic. Tobiasson, W., et al. (1977, p.244-251) Mathematical model to predict frost heave. Berg. R.L., et al., (1977, p.244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p.244-251) Permafrost and active layer on a northern Alaskan road. Berg. R.L., et al., (1978, p.615-621) MP 1302 Numerical simulation of air bubbler systems. Ashton, G.D., (1978, p.231-238) Pundamentals of ice lens formation. Takagi, S., (1978, p.232-242) MP 1173 Heat and moisture flow in unsaturated soils. O'Neill, K., (1979, p.304-309) Dessign procedures for underground heat sink systems. Sub-	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1583 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-23] MP 1593 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 661-] Predicting lake ice decay. Ashton, G.D., [1983, 4p.] Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. fall, 1983, p.240-243] Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Freezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] Fixed mesh finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441], MP 1693 Fixed mesh finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441], MP 1792 West antarctic sea ice. Ackley, S.F., [1984, p.88-95] MP 1693 Two-dimensional model of coupled heat and moisture transport in frost heaving soils. Guymon, G.L., et al., [1984, p.91-98] Simple model of ice segregation using an analytic function to	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-13 Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 14p.] Waste heat recovery for building heating. Sector, P.W., SR 77-12 Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 17p.] Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] Waste heat recovery for heating purposes. [1977, 41p.] Waste heat recovery for heating purposes. [1977, 41p.] Phetteplace, G., MP 1256 Waste heat utilization through soil heating. McFadden, T., et al., [1980, 14p.] Transient analysis of beat transmission systems. Phette-
Heat sources Thermal energy and the environment. Crosby, R.L., et al., (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p.105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) MP 1343 Heat transfer in drill holes in Antarctic ice. al., (1976, 15p.) Numerical simulation of air bubbler systems. (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., (1977, 54p.) MP 1336 Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p.244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p.244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p.244-251) Permafrost and active layer on a northern Alaskan road. Berg. R.L., et al., (1978, p.615-621) Numerical simulation of air bubbler systems. Ashton, G.D., (1978, p.231-238) Pundamentals of ice lens formation. Takagi, S., (1978, p.235-242) Heat and moisture flow in unsaturated soils. O'N'eill, K., (1979, p.304-309) Design procedures for underground heat sink systems. Stubstad, J.M., et al., (1979, 186p. in var. pagns.)	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] MP 1893 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] CR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. SR 83-19 Thermal patterns in ice under dynamic loading. MP 1642 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] SR 83-22 Freezing in a pipe with turbulent flow. Albert, M.R., et al. [1983, p.102-112] Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] Fixed meah finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] MP 1693 Fixed meah finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] MP 1792 West antarctic sea ice. Ackley, S.F., [1984, p.88-95] MP 1678 Simple model of ice segregation using an analytic function to model heat and soll-water flow. Firomadia, T.V., II, et al. [1984, p.99-104] MP 2104	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 Ice engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 4p.] Waste heat recovery for building heating. Sector, F.W., [1977, 24p.] SR 77-15 Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] Waste heat recovery for heating purposes. Phetteplace, G., [1978, p.30-33] Waste heat utilization through soil heating. SR 80-18 Waste heat utilization through soil heating. McPadden, T., et al., [1980, 14p.] Waste heat utilization through soil heating. McPadden, T., et al., [1980, 195-120] Transient analysis of heat transmission systems. Phetteplace, G., [1981, 53p.] Heat loss from the central heat distribution system, Fort
Heat sources Thermal energy and the environment. Crosby, R.L., et al., (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p. 105-120) MP 1363 Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) MP 1243 Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., (1976, 15p.) Nmerical simulation of air bubbler systems. Ashton, G.D., (1977, p. 765-778) Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) MR 133 Maintaining buildings in the Arctic. Tobiasson, W., et al., (1977, p. 244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p. 244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, 12p.) Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., (1978, p.615-621) Nmerical simulation of air bubbler systems. Ashton, G.D., (1978, p.231-238) Pundamentals of ice lens formation. Takagi, S., (1978, p.235-242) Heat and moisture flow in unsaturated soils. O'Neill, K., (1979, p.304-309) Design procedures for underground heat sink systems. Stubstad, J.M., et al., (1979, 156p. in var. pagns.) SR 79-08 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., (1979, 5p.)	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-23] Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.34-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] CR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. SR 83-19 Tharmal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] SR 83-22 Freezing in a pipe with turbulent flow. Albert, M.R., et al., (1983, p.102-112) Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.27-229) MP 1693 Fixed mesh finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] MP 1792 West antarctic sea ice. Ackley, S.F., [1984, p.88-95] MP 1818 Two-dimensional model of coupled heat and moisture transport in frost heaving soils. Guymon, G.L., et al., [1984, p.91-98) Simple model of ice segregation using an analytic function to model beat and soil-water flow. Hromadka, T.V., II, et al., [1984, p.99-104] Aerosol growth in a cold environment. Yen, YC., [1984-66]	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. AMP 942 Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 Ice engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 19.] Waste heat recovery for building heating. Sector, P.W., [1977, 24p.] Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 14p.] Waste heat recovery for heating purposes. Phetteplace, G., (1981, 14p.) Waste heat recovery for heating purposes. Phetteplace, G., (1981, 14p.) Waste heat utilization through soil heating. SR 80-18 Waste heat utilization through soil heating. CR 81-24 Heat loss from the central heat distribution systems. Phetteplace, G., [1981, 33p.] Resident. The simple systems. Phetteplace, G., [1981, 33p.] Resident. The system systems and systems. Phetteplace, G., [1981, 33p.] Resident. The system systems are system. Fort Wainwright. Phetteplace, G.E., [1982, 20p.] MP 1980
Heat sources Thermal energy and the environment. Crosby, R.L., et al. (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al. (1980, p. 105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) Heat transfer in drill holes in Antarctic ice. MP 1243 Heat transfer in drill holes in Antarctic ice. CR 76-12 Numerical simulation of air bubbler systems. (1977, p. 765-778) Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., (1977, 54p.) MP 936 Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., (1977, 54p.) MP 1313 Maintaining buildings in the Arctic. Tobiasson, W., et al., (1977, p. 244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, 12p.) Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., (1978, p. 231-233) NMP 1618 Pundamentals of ice lens formation. Takagi, S., (1978, p. 235-242) MP 1173 Heat and moisture flow in unsaturated soils. O'Neill, K., (1979, p. 304-305) Design procedures for underground heat sink systems. Stubstad, J.M., et al., (1979, 5p.) CR 79-14	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1583 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] MP 1593 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.25-32] MP 1593 Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-12 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] MP 1662 Thermal patterns in ice under dynamic loading. Fish, A.M., MP 1742 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Freezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] Fixed mesh finite element solution for cartesiant two-dimensional phase change. O'Neill, K., [1983, p.436-441] West antarctic sea ice. Ackley, S.F., [1984, p.88-95] MP 1678 Simple model of ice segregation using an analytic function to model heat and soll-water flow. Hromadka, T.V., II, et al., [1984, p.99-104] Aerosol growth in a cold environment. Yen, YC., [1984, 21-3] Deterioration of floating ice covers. Ashton, G.D., [1984, p.1676]	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] loe engineering complex adopts heat pump energy system. Aamot, H.W.C., (1977, p.25-26) Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 loe engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 4p.] Waste heat recovery for building heating. Sector, P.W., [1977, 24p.] Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 17p.; Temporary protection of winter construction. Bennett, F.L., [1977, 41p.] Waste heat recovery for heating purposes. Phetteplace, G., [1978, p.30-33] Deicing a satellite communication antenna. Hanamoto, B., et al., [1980, 14p.] Waste heat utilization through soil heating. McPadden, T., et al., [1980, p.105-120] Transient analysis of heat transmission systems. Phetteplace, G., [1981, 53p.] Heating and cooling method for measuring thermal conductivity. McGaw, R., [1984, 8p.] MP 1891
Heat sources Thermal energy and the environment. Crosby, R.L., et al. (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al. (1980, p.105-120) Waste heat utilization through soil heating. McFadden, T., et al. (1980, p.105-120) MP 1363 Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) MP 1243 Heat transfer in drill holes in Antarctic ice. Yen, YC., et al. (1976, 15p.) Numerical simulation of air bubbler systems. (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al. (1977, 54p.) CR 77-15 Mathematical model to predict frost heave. Berg, R.L., et al. (1977, p.24-251) MP 1131 MP 1508 Heat transfer over a vertical melting plate. Yen, YC., et al. (1977, p.244-251) Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al. (1978, p.615-621) NP 1102 Numerical simulation of air bubbler systems. Ashton, G.D., (1978, p.231-238) Pundamentals of ice lens formation. Takagi, S., (1978, p.235-242) MP 1173 Heat and moisture flow in unsaturated soils. O'Neill, K., (1979, p.304-309) Design procedures for underground heat sink systems. Stubstad, J.M., et al., (1979, 186p. in var. pagns.) SR 79-08 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., (1979, p.5p.) Accelerated ice growth in rivers. Calkins, D.J., (1979, 5p.) Accelerated ice growth in rivers. Calkins, D.J., (1979, 5p.) Accelerated ice growth in rivers. Calkins, D.J., (1979, 5p.) CR 79-13 Snow accumulation, distribution, melt, and runoff. Colbeck, MP 1233	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-23] MP 1893 Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 661] CR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. MP 1642 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Freezing in a pipe with turbulent flow. Albert, M.R., et al. [1983, p.102-112] Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] Fixed mesh finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] MP 1693 Fixed mesh finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] MP 1792 West antarctic sea ice. Ackley, S.F., [1984, p.88-95] MP 1893 Simple model of ice segregation using an analytic function to model heat and soil-water flow. Hromadka, T.V., II, et al. [1984, p.99-104] Aerosol growth in a cold environment. Yen, YC., [1984, 21p.] Designing for frost heave conditions. Croy, F.E., et al. [1984, p.22-44] Designing for frost heave conditions. Croy, F.E., et al. [1984, p.22-44]	Simplified design procedures for heat transmission system piping. Phetterplace, G.B., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetterplace, G.B., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 3p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-13 Ice engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 4p.] Waste heat recovery for building heating. Sector, P.W., SR 77-15 Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 17p.] Temporary protection of winter construction. Bennett, F.L., (1977, 41p.) Waste heat recovery for heating purposes. Phetteplace, G., [1980, 14p.] Waste heat recovery for heating purposes. MCP 1256 Deicing a satellite communication antenna. Hanamoto, B., SR 77-39 Deicing a satellite communication systems. Phetteplace, G., [1981, 53p.] Heat loss from the central heat distribution systems. Fort Wainwright. Phetteplace, G.E., [1982, 20p.] MP 1891 Introduction to heat tracing. Henry, K., [1986, 20p.) MP 1891
Heat sources Thermal energy and the environment. Crosby, R.L., et al., (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p.105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) MP 1363 Heat transfer in drill holes in Antarctic ice. al., (1976, 15p.) Numerical simulation of air bubbler systems. (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) CR 76-12 Mathematical model to predict frost heave. Berg, R.L., et al., (1977, p.244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p.244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p.244-251) Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., (1978, p.615-621) Numerical simulation of air bubbler systems. Ashton, G.D., (1978, p.231-238) Rundamentals of ice lens formation. Takagi, S., (1978, p.235-242) Heat and moisture flow in unsaturated soils. O'Neill, K., (1979, p.304-309) Design procedures for underground heat sink systems. Stubstad, J.M., et al., (1979, 156p. in var. pagns.) SR 79-08 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., (1979, p.465-468) Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) CR 79-12 Snow accumulation, distribution, melt, and runoff. Colbeck, S.C., et al., (1979, p.465-468) Point source bubbler systems to suppress ice.	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] CR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. SR 83-19 Thermal patterns in ice under dynamic loading. Fish, A.M., MP 1742 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] SR 83-22 Freezing in a pipe with turbulent flow. Albert, M.R., et al. [1983, p.102-112] Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] Fixed meah finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] MP 1792 West antarctic sea ice. Ackley, S.F., [1984, p.88-95] Two-dimensional model of coupled heat and moisture transport in frost heaving soils. Guymon, G.L., et al., [1984, p.91-94] Aerosol growth in a cold environment. Yen, YC., [1984, p.16-37] Designing for frost heave conditions. Crory, F.S., et al., 1984, p.22-44; Preezing of a semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1984, p.103-106]	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Asmot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Asmot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Ice engineering complex adopts heat pump energy system. Asmot, H.W.C., [1977, p.25-26] MP 893 Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] Ice engineering facility heated with a central heat pump system. Asmot, H.W.C., et al., [1977, 4p.] Waste heat recovery for building heating. Sector, P.W., [1977, 24p.] Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 17p.] Temporary protection of winter construction. Bennett, F.L., [1977, 17p.] Swaste heat recovery for heating purposes. Phetteplace, G., [1978, p.30-33] Waste heat recovery for heating purposes. Phetteplace, G., [1978, p.30-33] Waste heat utilization through soil heating. McFadden, T., et al., [1980, 14p.] Waste heat utilization through soil heating. McFadden, T., et al., [1980, p.105-120] MP 1363 Transient analysis of heat transmission systems. Phetteplace, G., [1981, 53p.] Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., [1982, 20p.) MP 1980 Hesting and cooling method for measuring thermal conductivity. McCaw, R., [1984, 8p.] Introduction to heat tracing. Henry, K., [1986, 20p.] TD 86-01 Height finding Height variation along sea ice pressure ridges. Hibler, W.D.,
Heat sources Thermal energy and the environment. Crosby, R.L., et al., (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p. 105-120) MP 1363 Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) MP 1243 Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., (1976, 15p.) NP 1243 Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., (1976, 15p.) NP 1243 Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) Reprimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) Reprimental scaling in the Arctic. Tobiasson, W., et al., (1977, p.24-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p.24-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, 12p.) Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., (1978, p.615-621) NP 1308 Prudamentals of ice lens formation. Takagi, S., (1978, p.235-242) Heat and moisture flow in unsaturated soils. O'Neill, K., (1979, p.304-309) Design procedures for underground heat sink systems. Stubstad, J.M., et al., (1979, 186p., in var. pagns.) SR 79-08 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., (1979, p.465-468) Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Dynamic thermodynamic sea ice model. Hibler, W.D., III, (1979, p.815-8446) MP 1247	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-23] Approximate balation to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] CR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. SR 83-19 Tharming beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.240-243] Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Fish, A.M., MP 1742 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Fish, A.M., MP 1893 Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.27-229] MP 1693 Fixed mesh finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-44] MP 1693 Fixed mesh finite element solution for cartesian two-dimensional model of coupled heat and moisture transport in frost heaving soils. Guymon, C.L., et al., [1984, p.91-98] Simple model of ice segregation using an analytic function to model beat and soil-water flow. Hromadks, T.V., II, et al., [1984, p.99-104] Aerosol growth in a cold environment. Yen, YC., [1984, p.26-33] Deterioration of floating ice covers. Ashton, G.D., [1984, p.26-34] Deterioration of floating ice covers. Ashton, G.D., [1984, p.26-36] Deterioration of floating ice covers. Ashton, G.D., [1984, p.26-37] Designing for frost heave conditions. Crory, F.E., et al., MP 1705 Preezing of a semi-infinite medium with initial temperature gradient. Lunardini, V.J., (1984, p.103-106) MP 1740	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Amot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] loe engineering complex adopta heat pump energy system. Aamot, H.W.C., (1977, p.25-26) Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 Ice engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 4p.] Waste heat recovery for building heating. Sector, P.W., [1977, 24p.] Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 17p.] Temporary protection of winter construction. Bennett, F.L., [1977, 4p.] Waste heat recovery for heating purposes. Phetteplace, G., [1978, p.30-33] Deicing a satellite communication antenna. Hanamoto, B., SR 77-39 Waste heat recovery for heating purposes. Phetteplace, G., [1980, 14p.] Waste heat utilization through soil heating. McPadden, T., et al., [1980, p.105-120] Transient analysis of heat transmission systems. Phetteplace, G., [1981, 53p.] Heating and cooling method for measuring thermal conductivity. McGaw, R., [1984, 8p.] MP 1980 Heating and cooling method for measuring thermal conductivity. McGaw, R., [1984, 8p.] MP 1891 Introduction to heat tracing. Henry, K., [1986, 20p.)
Heat sources Thermal energy and the environment. Crosby, R.L., et al., (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p. 105-120) MP 1363 Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) MP 1243 Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., (1976, 15p.) NP 1243 Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., (1976, 15p.) NP 1243 Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) Reprimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) Reprimental scaling in the Arctic. Tobiasson, W., et al., (1977, p.24-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p.24-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, 12p.) Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., (1978, p.615-621) NP 1308 Prudamentals of ice lens formation. Takagi, S., (1978, p.235-242) Heat and moisture flow in unsaturated soils. O'Neill, K., (1979, p.304-309) Design procedures for underground heat sink systems. Stubstad, J.M., et al., (1979, 186p., in var. pagns.) SR 79-08 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., (1979, p.465-468) Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Dynamic thermodynamic sea ice model. Hibler, W.D., III, (1979, p.815-8446) MP 1247	Solution of two-dimensional freezing and thawing problems. O'Neill, K., (1983, p.653-658) Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., (1983, p.649-652) MP 1883 Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., (1983, p.25-32) Approximate solution to conduction freezing with density variation. Lunardini, V.J., (1983, p.43-45) Computer models for two-dimensional transient heat conduction. Albert, M.R., (1983, 66p.) Predicting lake ice decay. Ashton, G.D., (1983, 4p.) SR 83-12 Predicting lake ice decay. Ashton, G.D., (1983, 4p.) SR 83-12 Thawing beneath insulated structures on permafrost. Lunardini, V.J., (1983, p.750-755) Thermal patterns in ice under dynamic loading. Fish, A.M., MP 1742 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., (1983, 20p.) Freezing in a pipe with turbulent flow. Albert, M.R., et al., (1983, p.102-112) Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., (1983, p.227-229) Fixed mesh finite element solution for cartesiant two-dimensional phase change. O'Neill, K., (1983, p.436-441) West antarctic sea ice. Ackley, S.F., (1984, p.88-95) MP 1678 Simple model of ice segregation using an analytic function to model heat and soli-water flow. Hromadka, T.V., II, et al., (1984, p.99-104) Aerosol growth in a cold environment. Yen, Y.C., (1984, p.19-196) Deterioration of floating ice covers. Ashton, G.D., (1984, p.26-33) Designing for frost heave conditions. Crory, F.E., et al., (1984, p.26-33) Designing for frost heave conditions. Crory, F.E., et al., (1984, p.26-33) Preezing of a semi-infinite medium with initial temperature gradient. Lunardini, V.J., (1984, p.103-106) MP 1746	Simplified design procedures for heat transmission system piping. Phetteplace, G.B., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.B., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regiona. Aamot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 3p.] Is 76-17 Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] Ice engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 41p.] Waste heat recovery for building heating. Sector, P.W., [1977, 24p.] Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 17p.] Temporary protection of winter construction. Bennett, F.L., [1977, 17p.] Waste heat recovery for heating purposes. Phetteplace, G., [1978, p.30-33] Deicing a satellite communication antenna. Hanamoto, B., SR 77-39 Waste heat undilization through soil heating. McPadden, T., et al., [1980, 14p.] Waste heat utilization through soil heating. McPadden, T., et al., [1980, 14p.] Waste heat utilization through soil heating. McPadden, T., et al., [1980, 14p.] Waste heat the central heat distribution systems. Phetteplace, G., [1981, 53p.] Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., [1982, 20p.) MP 1980 Heating and cooling method for measuring thermal conductivity. McGaw, R., [1984, 8p.] MP 1896.01 Height flading Height variation along sea ice pressure ridges. Hibler, W.D., III, et al., [1975, p.191-199] Heatlose floor as surface wave with a dielectric alab discon-
Heat sources Thermal energy and the environment. Crosby, R.L., et al., (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p.105-120) Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) MP 1343 Heat transfer in drill holes in Antarctic ice. al., (1976, 15p.) MP 1243 Heat transfer in drill holes in Antarctic ice. al., (1976, 15p.) Numerical simulation of air bubbler systems. Ashton, G.D., (1977, p.765-778) Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) MP 1336 Hand transfer over a vertical melting plate. Aphton, G.D., (1971, 1978, p.615-621) Numerical simulation of air bubbler systems. Ashton, G.D., (1977, p.22-123) Permafrost and active layer on a northern Alsakan road. Berg. R.L., et al., (1978, p.615-621) Numerical simulation of air bubbler systems. Ashton, G.D., (1978, p.231-233) Pundamentals of ice lens formation. Takagi, S., (1978, p.235-242) Heat and moisture flow in unsaturated soils. O'N'eill, K., (1979, p.304-309) Design procedures for underground heat sink systems. Stubstad, J.M., et al., (1979, 186p. in var. pagns.) SR 79-08 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., (1979, p.465-468) Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) CR 79-12 Dynamic thermodynamic sea ice model. Hibler, W.D., III, (1979, p.815-846) Application of heat pipes on the Trans-Alaska Pipeline.	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-23] Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66h.] CR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. SR 83-19 Thamisent heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Fish, A.M., MP 1742 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Fish, A.M., MP 1893 Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] MP 1693 Fixed mesh finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] West antarctic sea ice. Ackley, S.F., [1984, p.88-95] MP 1693 Fixed mesh finite element solution for cartesian two-dimensional model of coupled heat and moisture transport in frost heaving soils. Guymon, G.L., et al., [1984, p.91-98] Simple model of ice segregation using an analytic function to model heat and soil-water flow. Hromadka, T.V., II, et al., [1984, p.99-104] Aerosol growth in a cold environment. Yen, YC., [1984, p.66-37] Deterioration of floating ice covers. Ashton, G.D., [1984, p.66-37] Deterioration of floating ice covers. Ashton, G.D., [1984, p.66-37] Preezing of a semi-infinite medium with initial temperature gradient. Lunardini, V.J., (1984, p.103-106) MP 1705 Frezing ice dynamics. Daly, S.F., [1984, 46p.] MP 1706 Prazil ice dynamics. Daly, S.F., [1984, 46p.] MP 1707 Respectively.	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. AMP 942 Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., (1977, p.25-26) MP 893 Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] SR 77-03 Ice engineering facility heated with a central heat pump system. Aamot, H.W.C., et al., [1977, 19.] Solving problems of ice-blocked drainage facilities. Carey, K.L., (1977, 17p.) SSR 77-39 Waste heat recovery for building heating. Sector, P.W., [1977, 24p.] Solving problems of ice-blocked drainage facilities. Carey, K.L., (1977, 14p.) SR 77-39 Waste heat recovery for heating purposes. Phetteplace, G., (1981, 39.) Deicing a satellite communication antenna. Hanamoto, B., et al., (1980, 14p.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p.105-120) Transient analysis of heat transmission systems. Phetteplace, G., (1981, 53p.) Heating and cooling method for measuring thermal conductivity. McGaw, R., (1984, 8p.) MP 1980 Heating and cooling method for measuring thermal conductivity. McGaw, R., (1984, 8p.) MP 1891 Introduction to heat tracing. Henry, K., (1986, 20p.) MP 1891 Introduction to heat tracing. Henry, K., (1986, 20p.) MP 1891 Introduction to heat tracing. Henry, K., (1986, 20p.) MP 1891 Introduction to heat tracing. Henry, K., (1986, 20p.) MP 1891 Introduction to heat tracing. Henry, K., (1986, 20p.) MP 1892 Laboratory experiments on icing of rotating blades. Ackley,
Heat sources Thermal energy and the environment. Crosby, R.L., et al., (1975, 3p. + 2p. figs.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p. 105-120) MP 1363 Heat transfer Formation of ice ripples on the underside of river ice covers. Ashton, G.D., (1971, 157p.) Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., (1976, 15p.) Numerical simulation of air bubbler systems. Ashton, G.D., (1977, p. 765-778) Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) MP 1303 Experimental scaling study of an annular flow ice-water heat sink. Substad, J.M., et al., (1977, 54p.) MP 1371 Maintaining buildings in the Arctic. Tobiasson, W., et al., (1977, p. 244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p. 244-251) Heat transfer over a vertical melting plate. Yen, YC., et al., (1977, p. 244-251) Numerical simulation of air bubbler systems. Ashton, G.D., (1978, p. 235-242) Numerical simulation of air bubbler systems. Ashton, G.D., (1978, p. 235-242) Heat and moisture flow in unsaturated soils. O'Neill, K., (1979, p. 304-309) Design procedures for underground heat sink systems. Stubstad, J.M., et al., (1979, 156p. in var. pagns.) Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., (1979, p. 165p. in var. pagns.) SR 79-08 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., (1979, p. 465-468) Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Dynamic thermodynamic sea ice model. Hibber, W.D., III, (1979, p. 815-844) Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.E., (1979, 27p.) Turbulent heat transfer systems to suppress ice. Ashton, G.D., (1979, 12p.) Turbulent heat transfer proma river to its ice cover. Haynes, F.D., et al., (1979, 27p.) SR 79-26 Turbulent heat transfer from a river to its ice cover. Haynes, SR 79-12 Dynamic thermodynamic sea ice model. Hibber, W.D., III, (1979, 12p.	Solution of two-dimensional freezing and thawing problems. O'Neill, K., [1983, p.653-658] Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652] Approximate phase change solutions for insulated buried cylinders. Lunardini, V.J., [1983, p.25-32] Approximate solution to conduction freezing with density variation. Lunardini, V.J., [1983, p.43-45] Computer models for two-dimensional transient heat conduction. Albert, M.R., [1983, 66p.] CR 83-12 Predicting lake ice decay. Ashton, G.D., [1983, 4p.] SR 83-19 Thawing beneath insulated structures on permafrost. Lunardini, V.J., [1983, p.750-755] Thermal patterns in ice under dynamic loading. SR 83-19 Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] Freezing in a pipe with turbulent flow. Albert, M.R., et al., [1983, p.102-112] Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229] Fixed meah finite element solution for cartesian two-dimensional phase change. O'Neill, K., [1983, p.436-441] Two-dimensional model of coupled heat and moisture transport in frost heaving soils. Guymon, G.L., et al., [1984, p.91-98] Simple model of ice segregation using an analytic function to model heat and soil-water flow. Hromadka, T.V., II, et al., [1984, p.99-104] Aerosol growth in a cold environment. Yen, YC., [1984, p.26-33] Designing for frost heave conditions. Crory, F.E., et al., [1984, p.26-33] Designing for frost heave conditions. Crory, F.E., et al., [1984, p.26-33] Designing for frost heave conditions. Crory, F.E., et al., [1984, p.26-33] Designing for frost heave conditions. Crory, F.E., et al., [1984, p.26-33] Designing for frost heave conditions. Crory, F.E., et al., [1984, p.26-33] Designing for frost heave conditions. Crory, F.E., et al., [1984, p.26-33] Designing for frost heave conditions. Crory, F.E., et al., [1984, p.26-33] Designing for frost heave conditions. Crory, F.E., et al., [1984, p.26-34] Designing f	Simplified design procedures for heat transmission system piping. Phetteplace, G.E., [1985, p.451-456] MP 1979 Simple design procedure for heat transmission system piping. Phetteplace, G.E., [1985, p.1748-1752] MP 1942 Heating Management of power plant waste heat in cold regions. Aamot, H.W.C., [1975, p.22-24] Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 Energy conservation in buildings. Ledbetter, C.B., [1976, 8p.] Ice engineering complex adopts heat pump energy system. Aamot, H.W.C., [1977, p.25-26] Computer derived heat requirements for buildings in cold regions. Bennett, F.L., [1977, 113p.] Ice engineering facility heated with a central heat pump yet m. Aamot, H.W.C., et al., [1977, 4p.] Waste heat recovery for building heating. Scator, P.W., (1977, 24p.) Solving problems of ice-blocked drainage facilities. Carey, K.L., (1977, 17p.; Temporary protection of winter construction. Bennett, F.L., (1977, 41p.) Waste heat recovery for heating purposes. Phetteplace, G., (1978, p.30-33) Deicing a satellite communication antenna. Hanamoto, B., et al., (1980, 14p.) Waste heat utilization through soil heating. McFadden, T., et al., (1980, p.105-120) Transient analysis of heat transmission systems. Phetteplace, G., (1981, 53p.) Heating and cooling method for measuring thermal conductivity. McGaw, R., (1984, 8p.) Introduction to heat tracing. Henry, K., (1986, 20p.) TD 86-01 Height finding Height variation of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al., [1978, 10p.) CR 78-08

Helicopters (cent.)	Conference on Computer and Physical Modeling in Hydrau-	Combined icing and wind loads on a simulated power line test
Ice adhesion tests on coatings subjected to rain erosion.	lic Engineering, 1980. Ashton, G.D., ed, [1980, 492p., MP 1321	span. Govoni, J.W., et al, [1984, 7p.] MP 2114
Minek, L.D., t1980, 14p.; SR 88-28 Helicopter snow obscuration sub-test. Ebersole, J.F.,	Rational design of overland flow systems. Martel, C.J., et al,	Ice accretion under natural and laboratory conditions. Itaga- ki, K., et al., [1985, p.225-228] MP 2009
[1984, p.359-376] MP 2094	[1980, p.114-121] MP 1400	Measurement of icing on offshore structures. Minsk, L.D., 1985, p.287-2921 MP 2010
High pressure tests Lock wall descing with high velocity water jet at Soo Locks,	Measurement of the shear stress on the underside of simulated ice covers. Calkins, D.J., et al, [1980, 11p.]	[1985, p.287-292] MP 2010 Transfer of meteorological data from mountain-top sites.
Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973	CR 80-24	Govoni, J.W., et al, [1986, 6p.] MP 2107
Icebreaking by gas blasting. Mellor, M., [1984, p.93-102] MP 1827	Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media.	Ice acceptics Ultrasonic investigation on ice cores from Antarctica.
History	Nakano, Y., [1981, p.57-64] MIP 1419 Soil hydraulic conductivity and moisture retention features.	Kohnen, H., et al, [1979, 16p.] CR 79-16
Canol Pipeline Project: a historical review. Ueda, H.T., et al,	Ingersoil, J., [1981, 11p.] SR 81-02	Ultrasonic investigation on ice cores from Antarctica. Kohnen, H., et al, (1979, p.4865-4874) MP 1239
(1977, 32p.) SR 77-34 Overview of existing land treatment systems. Iskandar, I.K.,	Hydraulic characteristics of the Deer Creek Lake land trest- ment site during wastewater application. Abele, G., et al,	Investigation of the acoustic emission and deformation re-
[1978, p.193-200] MIP 1150	[1981, 37p.] CR 81-07	sponse of finite ice plates. Xirouchakis, P.C., et al, [1981, 19p.] CR 81-86
Hearfrest Dielectric properties of dislocation-free ice. Itagaki, K.,	Data acquisition in USACRREL's flume facility. Daly, S.F., et al, [1985, p.1053-1058] MIP 2089	Acoustic emission and deformation response of finite ice
[1978, p.207-217] MP 1171	Hydrocarbone	plates. Xirouchakis, P.C., et al, [1981, p.385-394] MP 1455
Communication tower icing in the New England region. Mulherin, N., et al. [1986, 7p.] MP 2109	Fate of crude and refined oils in North Slope soils. Sexstone, A., et al, 11978, p.339-3471 MP 1186	Acoustic emission and deformation of ice plates. Xiroucha- kia, P.C., et al. (1982, p.129-139) MP 1589
Houses	Halocarbons in water using headspace gas chromatography.	kis, P.C., et al. [1982, p.129-139] MP 1389 Acoustic emissions from polycrystalline ice. St. Lawrence,
Post occupancy evaluation of a planned community in Arctic Canada. Bechtel, R.B., et al, [1980, 27p.] SR 80-06	Leggett, D.C., [1981, 13p.] SR 81-26 Hydrodynamics	W.F., et al, [1982, p.183-199] MP 1524
Post occupancy evaluation for communities in hot or cold	Moving boundary problems in the hydrodynamics of porous	Acoustic emissions from polycrystalline ice. St. Lawrence, W.F., et al, [1982, 15p.] CR 82-21
regions. Bechtel, R.B., et al, [1980, 57p.] SR 88-29 Human factors	media. Nakano, Y., [1978, p.125-134] MP 1343 Remote sensing data for water masses in Delaware Bay and	Polycrystalline ice creep in relation to applied stresses. Cole, D.M., (1983, p.614-621, MP 1582
Notes on conducting the behavior setting survey by interview	adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-	Laboratory studies of acoustic scattering from the underside
method. Ledbetter, C.B., [1976, 33p.] SR 76-14	1129 ₁ MP 1909 Hydrogen	of sea ice. Jezek, K.C., et al, [1985, p.87-91] MP 1912
Computer modeling of terrain modifications in the arctic and subarctic. Outcalt, S.I., et al, [1977, p.24-32]	Method for measuring enriched levels of deuterium in soil	Ice adhesion
MP 971	water. Oliphant, J.L., et al, [1982, 12p.] SR 82-25 Hydrogen percylée	Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-11
Small communities result in greater satisfaction. Ledbetter, C.B., [1977, 15p.] Ledbetter, SR 77-36	UV radiational effects on: Martian regolith water. Nadeau,	Ice adhesion tests on coatings subjected to rain erosion.
Construction equipment problems and procedures: Alaska	P.H., [1977, 89p.] MP 1072	Minsk, L.D., [1980, 14p.] SR 36-28
pipeline project. Hanamoto, B., [1978, 14p.]	Hydrologic cycle Seasonal regime and hydrological significance of stream ic-	Adhesion of ice to polymers and other surfaces. Itagaki, K., [1983, p.241-252] MP 1580
Human-induced thermokarst at old drill sites in northern	ings in central Alaska. Kane, D.L., et al, [1973, p.528- 540; MP 1026	Mechanisms for ice bonding in wet snow accretions on power
Alaska. Lawson, D.B., et al, [1978, p.16-23] MP 1254	Hydrology	lines. Colbeck, S.C., et al, [1983, p.25-30] MP 1633 Implications of surface energy in ice adhesion. Itagaki, K.,
Bibliography of permafrost soils and vegetation in the USSR. Andrews, M., r1978, 175p., SR 78-19	Spray application of waste-water effluent in a cold climate.	(1983, p.41-48) MP 1672
Andrews, M., [1978, 175p.] SR 78-19 Tundra recovery since 1949 near Fish Creek, Alaska. Law-	Cassell, E.A., et al, [1980, p.620-626] MP 1403 Cold Regions Science and Technology Bibliography. Cum-	Uplifting forces exerted by adfrozen ice on marine piles. Christensen, F.T., et al, [1985, p.529-542] MIP 1905
son, D.B., et al, [1978, 81p.] CR 78-28	mings, N.H., [1981, p.73-75] MIP 1372	Ice air interface
Communication in the work place: an ecological perspective. Ledbetter, C.B., [1979, 19p.] SR 79-03	Introduction to abiotic components in tundra. Brown, J., r1981, p.79; MIP 1432	Air-ice-ocean interaction in Arctic marginal ice zones. Wadhams, P., ed, [1981, 20p.] SR 81-19
Physical and thermal disturbance and protection of perma-	Sediment load and channel characteristics in subarctic upland	Configuration of ice in frozen media. Colbeck, S.C., 1982,
frost. Brown, J., et al, [1979, 42p.] SR 79-05 Surface disturbance and protection during economic develop-	catchments. Slaughter, C.W., et al, [1981, p.39-48] MP 1518	p.116-123 ₁ MP 1512 Marginal Ice Zone Experiment, Pram Strait/Greenland Sea,
ment of the North. Brown, J., et al, [1981, 88p.] MP 1467	Evaluation of procedures for determining selected aquifer	1984. Johannessen, O.M., ed, [1983, 47p.]
Human factors engineering	parameters. Daly, C.J., [1982, 104p.] CR 82-41 Tailwater flow conditions. Ferrick, M.G., et al, [1983,	SR 83-12 Marginal ice zones: a description of air-ice-ocean interactive
Temporary environment. Cold regions habitability. Bech-	31p. ₁ CTR 83-07	processes, models and planned experiments. Johannessen,
tel, R.B., et al, [1976, 162p.] SR 76-19 Guidelines for architectural programming of office settings.	Hydrologic forecasting using Landsat data. Merry, C.J., et al, [1983, p.159-168] MP 1691	O.M., et al, [1984, p.133-146] MIP 1673 Modeling the marginal ice zone. Hibler, W.D., III, ed,
Ledbetter, C.B., (1977, 14p.) SR 77-05	Hydrologic modeling from Landsat land cover data.	[1984, 99p.] SR 84-07
Humidity Effects of volume averaging on spectra measured with a hy-	McKim, H.L., et al. (1984, 19p.) SR 84-01 Hydrologic aspects of ice jams. Calkins, D.J., (1986, p.603-	On the role of ice interaction in marginal ice zone dynamics. Leppäranta, M., et al, [1984, p.23-29] MP 1781
grometer. Andreas, B.L., [1981, p.467-475]	609 ₁ MP 2116	Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed, [1985, 119p.]
MP 1728 Surface meteorology US/USSR Weddell Polynya Expedition,	Hygrometers Effects of volume averaging on spectra measured with a hy-	82 85-86
1981. Andreas, E.L., et al., (1983, 32p.) SR 83-14	grometer. Andreas, E.L., (1981, p.467-475) MP 1728	Ice bearing capacity Failure of an ice bridge DonWarton S.I. et al. 1976
New method for measuring the snow-surface temperature. Andreas, E.L., [1984, p.161-169] MIP 1867	New method for measuring the snow-surface temperature.	Failure of an ice bridge. DenHartog, S.L., et al, 1976, 13p. ₁ CR 76-29
Hummocks	Andreas, E.L., [1984, p.161-169] MP 1867	Concentrated loads on a floating ice sheet. Nevel, D.E., 1977, p.237-2451 MP 1062
Growth and flowering of tuesocks in northcentral Alaska. Haugen, R.K., et al, [1984, p.10-11] MIP 1950	Photomacrography of artifacts in transparent materials.	Ice blasting
Hydraulic fill	Marshall, S.J., (1976, 31p.) CR 76-40	Icebreaking concepts. Mellor, M., [1980, 18p.]
Construction and performance of the Hess creek earth fill dam, Livengood, Alaska. Simoni, O.W., [1973, p.23-34]	typamics of show and ice masses. Colbeck, S.C., ed, [1980, 468p.] MP 1297	Breaking ice with explosives. Mellor, M., [1982, 64p.]
MP 459	Ice accretion	CR \$2-40 Protection of offshore arctic structures by explosives. Mel-
Hydraulic jets Cutting ice with high pressure water jets. Mellor, M., et al,	Ice accumulation on ocean structures. Minsk, L.D., 1977, 42p. ₁ CR 77-17	lor, M., [1983, p.310-322] MIP 1605
(1973, 22p.) MP 1001	Ice accretion on ships. Itagaki, K., [1977, 22p.] SR 77-27	Icebreaking by gas blasting. Mellor, M., [1984, p.93-102] MP 1827
Heat transfer between water jets and ice blocks. Yen, YC., [1976, p.299-307] MP 862	Laboratory experiments on icing of rotating blades. Ackley,	Ice booms
Hydranlic structures	S.F., et al, [1979, p.85-92] MP 1236	Application of ice engineering and research to Great Lakes problems. Freitag, D.R., [1972, p.131-138]
Ice forces on model structures. Zahilansky, L.J., et al., [1975, p.400-407] MP 863	Numerical simulation of atmospheric ice accretion. Ackley, S.F., et al, [1979, p.44-52] MP 1235	MP 1615
Third International Symposium on Ice Problems, 1975.	Computer modeling of atmospheric ice accretion. Ackley,	Porces on an ice boom in the Beauharnois Canal. Perham, R.E., et al, [1975, p.397-407] MP 858
Frankenstein, G.E., ed, [1975, 627p.] MP 845	S.F., et al, [1979, 36p.] CR 79-04 Icing on structures. Minsk, L.D., [1980, 18p.]	Passage of ice at hydraulic structures. Calkins, D.J., et al,
Passage of ice at hydraulic structures. Calkina, D.J., et al., [1976, p.1726-1736] MIP 966	CR 80-31	[1976, p.1726-1736] NIP 966 Arching of two block sizes of model ice floes. Calkins, D.J.,
Hydraulic model investigation of drifting snow. Wuebben,	Tests of frazil collector lines to assist ice cover formation. Perham, R.E., [1981, p.442-448] MP 1488	et al, [1976, 11p.] CR 76-42
J.L., [1978, 29p.] CR 78-16 Undersea pipelines and cables in polar waters. Mellor, M.,	Computer modeling of time-dependent rime icing in the at- mosphere. Lozowski, E.P., et al, [1983, 74p.]	Force estimate and field measurements of the St. Marys River ice booms. Perham, R.B., 1977, 26p., CR 77-04
[1978, 34p.] CR 78-22	mosphere. Lozowski, B.P., et al, [1983, 74p.]	Some economic benefits of ice booms. Perham, R.E.,
Working group on ice forces on structures. Carstens, T., ed, [1980, 146p.] SR 88-26	Field measurements of combined icing and wind loads on	[1977, p.570-591] MIP 959
Hydraulic model study of a water intake under frazil ice con-		Ice and ship affects on the St Manus Diversion has no De-
	wires. Govoni, J.W., et al, (1983, p.205-215) MP 1637	lce and ship effects on the St. Marys River ice booms. Per- ham, R.E., [1978, p.222-230] MP 1617
ditions. Tantillo, T.J., [1981, 11p.] CR 81-03	wires. Govoni, J.W., et al., [1983, p.205-215] MP 1637 Atmospheric icing of structures. Minak, L.D., ed., [1983,	ham, R.E., 1978, p.222-230; MIP 1617 Righting moment in a rectangular ice boom timber or pon-
ditions. Tantillo. T.J., [1981, 11p.] Foundations of structures in polar waters. E.J., [1981, 16p.] CR 81-03 Chamberlain, SR 81-25	wires. Govoni, J.W., et al. (1983, p.205-215) MP 1637 Atmospheric icing of structures. Minak, L.D., ed. (1983, 366p.) SR 83-17 Self-shedding of accreted ice from high-speed rotors. Itaga-	ham, R.E., [1978, p.222-230] MP 1617 Righting moment in a rectangular ice boom timber or pon- toon. Perham, R.B., [1978, p.273-289] MP 1136 Performance of the St. Marya River ice booms, 1976-77.
ditions. Tantillo. T.J., [1981, 11p.] CR 81-63 Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] Hydraulic model study of Port Huron ice control structure.	wires. Govoni, J.W., et al., (1983, p.205-215) MP 1637 Atmospheric icing of structures. Minak, L.D., ed., (1983, 366p.) SR 83-17 Self-shedding of accreted ice from high-speed rotors. Itaga-ki, K., (1983, p.1-6) MP 1719	ham, R.E., [1978, p.222-230] MIP 1617 Righting moment in a rectangular ice boom timber or pon- toon. Perham, R.E., [1978, p.273-289] MIP 1136 Performance of the St. Marya River ice booms, 1976-77. Perham, R.E., [1978, 13p.] CR 78-24
ditions. Tantillo. T.J., [1981, 11p.] CR 81-03 Poundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Hydraulic model study of Port Huron ice control structure. Calkins, D.J., et al., [1982, 59p.] Structure to form an ice cover on river rapids in winter. Per-	wires. Govoni, J.W., et al., [1983, p.205-215] MP 1637 Atmospheric icing of structures. Minak, L.D., ed., [1983, 365p.] Self-shedding of accreted ice from high-speed rotors. Itaga-ki, K., [1983, p.1-6] Mechanical ice release from high-speed rotors. [1983, 8p.] CR 83-26	ham, R.E., [1978, p.222-230) MP 1617 Righting moment in a rectangular ice boom timber or pon- toon. Perham, R.B., [1978, p.273-289) MP 1136 Performance of the St. Marya River ice booms, 1976-77. Perham, R.E., [1978, 13p.] CR 78-24 Ice control arrangement for winter navigation. Perham, R.E., [1981, p.1096-1103) MP 1449
ditions. Tantillo, T.J., [1981, 11p.] CR 81-63 Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Hydrsulic model study of Port Huron ice control structure. Calkins, D.J., et al., [1982, 59p.] CR 82-34 Structure to form an ice cover on river rapids in winter. Perham, R.E., [1986, p.439-450] MP 2128	wires. Govoni, J.W., et al., [1983, p.205-215] MP 1637 Atmospheric icing of structures. Minak, L.D., ed., [1983, 366p.] SR 83-17 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., [1983, p.1-6] Mechanical ice release from high-speed rotors. Itagaki, K., [1983, 8p.] Assessment of ice accretion on offshore structures. Minak,	ham, R.E., [1978, p.222-230) MP 1617 Righting moment in a rectangular ice boom timber or pontoon. Perham, R.E., [1978, p.273-289) MP 1136 Performance of the St. Marya River ice booms, 1976-77. Perham, R.E., [1978, 13p.] CR 78-24 Ice control arrangement for winter navigation. Perham, R.E., [1981, p.1096-1103] MP 1449 Modeling hydrotogic impacts of winter navigation. Daly,
ditions. Tantillo. T.J., [1981, 11p.] CR 81-03 Poundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Hydraulic model study of Port Huron ice control structure. Calkins, D.J., et al., [1982, 59p.] Structure to form an ice cover on river rapids in winter. Per-	wires. Govoni, J.W., et al., [1983, p.205-215] MP 1637 Atmospheric icing of structures. Minak, L.D., ed., [1983, 365p.] Self-shedding of accreted ice from high-speed rotors. Itaga-ki, K., [1983, p.1-6] Mechanical ice release from high-speed rotors. [1983, 8p.] CR 83-26	ham, R.E., [1978, p.222-230) MP 1617 Righting moment in a rectangular ice boom timber or pon- toon. Perham, R.B., [1978, p.273-289) MP 1136 Performance of the St. Marya River ice booms, 1976-77. Perham, R.E., [1978, 13p.] CR 78-24 Ice control arrangement for winter navigation. Perham, R.E., [1981, p.1096-1103) MP 1449

Porce measurements and analysis of river ice break up. Deck, D.S., [1982, p.303-336] MP 1739	Ice forces on the Yukon River bridge—1978 breakup. John- son, P.R., et al, (1979, 40p.) MP 1384	break-up dates for the Yukon River; Pt. I. Rampart to White- horse, 1896-1978. Stephens, C.A., et al., [1979, c50]
Ice sheet retention structures. Perham, R.E., (1983, 33p.)	Break-up dates for the Yukon River; Pt. 1. Rampert to White-	leaves ₁ MP 1317
CR #3-30	horse, 1896-1978. Stephens, C.A., et al, [1979, c50]	Overview on the sessonal ses ice zone. Weeks, W.F., et al, [1979, p.320-337] MP 1328
Navigation ice booms on the St. Marys River. Perham, R.E., [1984, 12p.] CR 84-84	Break-up dates for the Yukon River; Pt.2. Alakanuk to Tans-	Winter thermal structure, ice conditions and climate of Lake
Porce distribution in a fragmented ice cover. Stewart, D.M.,	na, 1883-1978. Stephens, C.A., et al, [1979, c50 leaves]	Champlain. Batcs, R.E., [1980, 26p.] CR 88-82
et al, [1984, 16p.] CR 84-07	MP 1318 Medaline of ice in sixon. Ashton G D :1979 p 14/1-	Ice laboratory facilities for solving ice problems. Franken- stein, G.B., r1980, p.93-1031 MP 1301
Performance of the Allegheny River ice control structure, 1983. Deck, D.S., et al, [1984, 15p.] SR 84-13	Modeling of ice in rivers. Ashton, G.D., [1979, p.14/1-14/26] MP 1335	stein, G.E., [1980, p.93-103] MP 1301 Continuum see ice model for a global climate model. Ling,
loe sheet retention structures. Perham, R.E., (1984, p.339-	Break-up of the Yukon River at the Haul Road Bridge: 1979.	C.H., et al, [1980, p.187-196] MP 1622
348 ₁ MP 1832	Stephens, C.A., et al. (1979, 22p. + Figs.) MIP 1315	Clearing ice-clogged shipping channels. Vance, G.P., [1980, 13p.] CR 80-28
Controlling river ice to alleviate ice jam flooding. Deck, D.S., [1984, p.524-528] MP 1795	Forecasting ice formation and breakup on Lake Champlain. Bates, R.B., et al, [1979, 21p.] CR 79-26	[1980, 13p.] CR 80-28 Hyperbolic reflections on Beaufort Sea seismic records.
Controlling river ice to alleviate ice jam flooding. Deck,	Ice formation and breakup on Lake Champlain. Bates, R.B.,	Neave, K.G., et al, (1981, 16p.) CR 81-02
D.S., (1984, p.69-76) MP 1885	[1980, p.125-143 _] MP 1429	Hydraulic model study of a water intake under frazil ice con-
Upper Delaware River ice control—a case study. Zufelt, J.E., et al, [1986, p.760-770] MP 2005	Freshwater ice growth, motion, and decay. Ashton, G.D., [1980, p.261-304] MIP 1299	ditions. Tantillo, T.J., [1981, 11p.] CR 81-83 Summer conditions in the Prudhoe Bay area, 1953-75. Cox,
Ice bottom surface	Ice jams and meteorological data for three winters, Ottauque-	G.P.N., et al, [1981, p.799-808] MP 1457
Formation of ice ripples on the underside of river ice covers.	chee River, Vt. Bates, R.E., et al, [1981, 27p.] CR 81-01	Sea ice piling at Fairway Rock, Bering Strait, Alaska.
Ashton, G.D., [1971, 157p.] MP 1243 Grounded floebergs near Prudhoe Bay, Alaska. Kovacs, A.,	Ice force measurement on the Yukon River bridge. McFad-	Kovaca, A., et al., (1981, p.985-1000) MIP 1460 Ice distribution and winter ocean circulation. Kachemak Bay.
et al, [1976, 10p.] CR 76-34	den, T., et al, [1981, p.749-777] MP 1396	Alaska. Gatto, L.W., [1981, 43p.] CR 81-22
Some characteristics of grounded floebergs near Prudhoe Bay,	Breakup of solid ice covers due to rapid water level variations.	River ice suppression by side channel discharge of warm wa-
Alaska. Kovaca, A., et al, [1976, p.169-172] MP 1118	Billfalk, L., (1982, 17p.) CR 82-03 Field investigations of a hanging ice dam. Beltaca, S., et al,	ter. Ashton, G.D., [1982, p.65-80] MP 1528
Analysis of velocity profiles under ice in shallow streams.	[1982, p.475-488] MP 1533	Understanding the Arctic sea floor for engineering purposes. [1982, 141p.] SR 83-25
Calkins, D.J., et al, [1981, p.94-111] MP 1397	Force measurements and analysis of river ice break up.	Ice distribution and water circulation, Kachemak Bay, Alaska.
Pooling of oil under sea ice. Kovacs, A., et al, [1981, p.912- 922] MP 1459	Deck, D.S., [1982, p.303-336] MP 1739 Unsteady river flow beneath an ice cover. Ferrick, M.G., et	Gatto, L.W., (1982, p.421-435) MIP 1569
Electromagnetic subsurface measurements. Dean, A.M., Jr.,	al, [1983, p.254-260] MP 2079	Bering Strait sea ice and the Fairway Rock icefoot. Kovaca, A., et al, [1982, 40p.] CR 82-31
[1981, 19p.] SR 81-23	Analysis of rapidly varying flow in ice-covered rivers. Fer-	Atmospheric boundary layer measurements in the Weddell
lce flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al, [1984, p.185-190] MP 1824	rick, M.G., [1984, p.359-368] MP 1833	Sea. Andreas, E.L., [1982, p.113-115] MP 1610
Measuring multi-year ses ice thickness using impulse radar.	Ice jam research needs. Gerard, R., [1984, p.181-193] MP 1813	Observations of pack ice properties in the Weddell Sea. Ackley, S.F., et al, [1982, p.105-106] MIP 1668
Kovaca, A., et al, [1985, p.55-67] MP 1916	Mathematical modeling of river ice processes. Shen, H.T.,	Sea ice state during the Weddell Sea Expedition. Ackley,
Laboratory studies of acoustic scattering from the underside of sea ice. Jezek, K.C., et al, [1985, p.87-91]	[1984, p.554-558] MP 1973	S.F., et al, [1983, 6p. + 59p.] SR 83-2
MP 1912	Construction and calibration of the Ottauquechee River mod- el. Gooch, G., (1985, 10p.) SR 85-13	Offshore mechanics and Arctic engineering, symposium, 1983. [1983, 813p.] MP 1581
Rictromagnetic properties of multi-year sea ice. Morey, R.M., et al. r1985, p.151-167; MP 1902	Cazenovia Creek Model data acquisition system. Bennett,	Lake water intakes under icing conditions. Dean, A.M., Jr.,
R.M., et al, [1985, p.151-167] MP 1902 Electromagnetic measurements of multi-year sea ice using	B.M., et al, [1985, p.1424-1429] MIP 2090	[1983, 7p.] CR 83-15
impulse radar. Kovacs, A., et al, [1985, 26p.]	Vanadium and other elements in Greenland ice cores. Her-	Landsat-4 thematic mapper (TM) for cold environments. Gervin, J.C., et al, 1983, p.179-186; MP 1651
CR 85-13	ron, M.M., et al, [1976, 4p.] CR 76-24	lce jams in shallow rivers with floodplain flow. Calkins, D.J.,
Electromagnetic measurements of sea ice. Kovacs, A., et al, (1986, p.67-93) MP 2020	Stable isotope profile through the Ross Ice Shelf at Little	[1983, p.538-548] MP 1644
Ice breaking	America V, Antarctica. Dansgaard, W., et al. [1977, p.322-325] MP 1095	Science program for an imaging radar receiving station in Alaska. Weller, G., et al. (1983, 45p.) MP 1884
Cutting ice with high pressure water jets. Mellor, M., et al,	Changes in the composition of atmospheric precipitation.	Alaska. Weller, G., et al. [1983, 45p.] MIP 1884 Marginal ice zones: a description of air-ice-ocean interactive
[1973, 22p.] MP 1001 lee forces on vertical piles. Nevel, D.E., et al, [1977, 9p.]	Cragin, J.H., et al. [1977, p.617-631] MP 1079	processes, models and planned experiments. Johannessen,
CR 77-10	Vanadium and other elements in Greenland ice cores. Herron, M.M., et al. (1977, p.98-102) MP 1892	O.M., et al, [1984, p.133-146] MP 1673
loebreaker simulation. Nevel, D.E., [1977, 9p.]	ron, M.M., et al. (1977, p.98-102) MP 1092 Subsurface measurements of the Ross Ice Shelf, McMurdo	Model tests on two models of WTGB 140-foot icebreaker. Tatinclaux, J.C., (1984, 17p.) CR 84-83
CR 77-16 Investigation of ice clogged channels in the St. Marys River.	Sound, Antarctica. Kovaca, A., et al, [1977, p.146-148]	Offshore mechanics and Arctic engineering symposium,
Mellor, M., et al, [1978, 73p.] MP 1170	MP 1913 Subsurface measurements of McMurdo Ice Shelf. Gow,	1984. [1984, 3 vols.] MP 1675
Icebreaking concepts. Mellor, M., [1980, 18p.]	A.J., et al, (1979, p.79-80) MIP 1338	lce observation program on the semisubmersible drilling ves- sel SEDCO 708. Minsk, L.D., [1984, 14p.]
SR 80-02		SR 84-02
Ice characteristics in Whitefish Ray and St. Marys River in	Nitrogenous chemical composition of antarctic ice and snow.	
Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., [1980, 27p.] SR 88-32	Parker, B.C., et al, [1981, p.79-81] MP 1541	On the decay and retreat of the ice cover in the summer MIZ.
winter. Vance, G.P., [1980, 27p.] SR 88-32 Vibrations caused by ship traffic on an ice-covered waterway.	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea.	On the decay and retreat of the ice cover in the summer MIZ. Maykut, G.A., [1984, p.15-22] MP 1780
winter. Vance, G.P., [1980, 27p.] SR 88-32 Vibrations caused by ship traffic on an ice-covered waterway.	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SR 82-28 Physical, chemical and biological properties of winter sea ice	On the decay and retreat of the ice cover in the summer MIZ.
winter. Vance, G.P., [1980, 27p.] SR 88-32 Vibrations caused by ship traffic on an ice-covered waterway.	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p., Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107-	On the decay and retreat of the ice cover in the summer MIZ. Maykut, G.A., 1984, p.15-22; MP 1780 East Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., 1984, p.9-14; MP 1779 On the role of ice interaction in marginal ice zone dynamics.
winter. Vance, G.P., (1980, 27p.) SR 88-32. Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-05. Breaking ice with explosives. Mellor, M., (1982, 64p.) Protection of offshore arctic structures by explosives. Mel-	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107- 109] MP 1669	On the decay and retreat of the ice cover in the summer MIZ. Maykut, 0.4., 1984, p.15-22; MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., 1984, p.9-14; MP 1779 On the role of ice interaction in marginal ice zone dynamics. Lepptranta, M., et al., 1984, p.23-29; MP 1781
winter. Vance, G.P., [1980, 27p.] SR 88-32 Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., [1981, 27p.] CR 81-65 Breaking ice with explosives. Mellor, M., [1982, 64p.] CR 82-40 Protection of offshore arctic structures by explosives. Mellor, M., [1983, p.310-322] MP 1685	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SR 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al., [1983, 16p.] CR 83-06	On the decay and retreat of the ice cover in the summer MIZ. Maykut, G.A., 1984, p.15-22; MP 1780 East Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., 1984, p.9-14; MP 1779 On the role of ice interaction in marginal ice zone dynamics.
winter. Vance, G.P., [1980, 27p.] SR 88-32 Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., [1981, 27p.] CR 81-65 Breaking ice with explosives. Mellor, M., [1982, 64p.] CR 62-40 Protection of offshore arctic structures by explosives. Mellor, M., [1983, p.310-322] Navigation ice booms on the St. Marys River. Perham, R.B., [1984, 12p.] CR 84-64	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107- 109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al., [1983, 16p.] Morphology and ecology of diatoms in sea ice from the Wed-	On the decay and retreat of the ice cover in the summer MIZ. Maykut, 0.4., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) MCchanism for floe clustering in the marginal ice zone. Lep-
winter. Vance, G.P., (1980, 27p.) SR 88-32 Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 62-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Mayigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker.	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SR 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al., [1983, 16p.] CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al., [1984, 41p.] CR 84-85	On the decay and retreat of the ice cover in the summer MIZ. Maykut, G.A., [1984, p.15-22] MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al, [1984, p.9-14] MP 1779 On the role of ice interaction in marginal ice zone dynamics. Leppäranta, M., et al, [1984, p.23-29] MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al, [1984, p.63-71] MP 1784 Mechanism for floe clustering in the marginal ice zone. MP 1785
winter. Vance, G.P., (1980, 27p.) SR 89-32. Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65. Breaking ice with explosives. Mellor, M., (1982, 64p.), CR 82-40. Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107- 109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al., [1983, 16p.] Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al., [1984, 41p.] Sea ice and biological activity in the Antarctic. Clarke, D.B., et al., [1984, p.2087-2095] MP 1701	On the decay and retreat of the ice cover in the summer MIZ. Maykut, 0.4., (1984, p.15-22) MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., (1984, p.9-14) MP 1779 On the role of ice interaction in marginal ice zone dynamics. Lepptranta, M., et al., (1984, p.32-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) MP 1784 Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ice-related Rood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101)
winter. Vance, G.P., (1980, 27p.) SR 88-32 Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 82-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) CR 84-04 Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984,	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf, Cragin, J.H., et al., [1983, 16p.] CR 83-06 Morphology and ecology of distons in sea ice from the Weddell Sea. Clarke, D.B., et al., [1984, 41p.] CR 84-85 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al., [1984, p.2087-2095] MP 1701 Baseline acidity of ancient precipitation from the South Pole.	On the decay and retreat of the ice cover in the summer MIZ. Maykut, C.A., [1984, p.15-22] MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al, [1984, p.9-14] MP 1779 On the role of ice interaction in marginal ice zone dynamics. Leppäranta, M., et al, [1984, p.23-29] MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al, [1984, p.53-71] MP 1784 MP 1784 Inchanism for floe clustering in the marginal ice zone. Leppäranta, M., et al, [1984, p.73-76] MP 1785 Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al, [1984, p.85-101]
winter. Vance, G.P., (1980, 27p.) SR 89-32 Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 62-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) CR 84-04 Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) SR 84-65	Parker, B.C., et al. [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al, [1982, p.107- 109] MP 1669 Chemical fractionation of brine in the McMurdol ice Shelf Cragin, J.H., et al, [1983, 16p.] CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al, [1984, 41p.] CR 84-85 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al, [1984, p.2087-2095] Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al, [1984, 7p.] CR 84-15	On the decay and retreat of the ice cover in the summer MIZ. Maykut, CA., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., (1984, p.9-14) MP 1779 On the role of ice interaction in marginal ice zone dynamics. Leppiranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) MP 1784 Mechanism for floe clustering in the marginal ice zone. Leppiranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) MP 1712 Model simulation of 20 years of northern hemisphere sea-ice
winter. Vance, G.P., (1980, 27p.) SR 88-32 Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 82-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) CR 84-04 Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984,	Parker, B.C., et al. [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SR 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107- 109] MP 1669 Chemical fractionation of brine in the McMurdol ice Shelf. Cragin, J.H., et al., [1983, 16p.] CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al., [1984, 41p.] CR 84-85 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al., [1984, p.2087-2095] Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al., [1984, 7p.] Structure of ice in the central part of the Ross Ice Shelf, Antarctics. Zotikov, I.A., et al., [1985, p.39-44]	On the decay and retreat of the ice cover in the summer MIZ. Maykut, G.A., 1984, p.15-22; MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al, 1984, p.9-14; MP 1779 On the role of ice interaction in marginal ice zone dynamics. Leppäranta, M., et al, 1984, p.23-29; MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al, 1984, p.63-71; MP 1784 Mechanism for floe clustering in the marginal ice zone. Leppäranta, M., et al, 1984, p.73-76; MP 1785 Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al, 1984, p.85-101; MP 1712 Model simulation of 20 years of northern hemisphere soa-ice fluctuations. Walsh, J.E., et al, 1984, p.170-176; MP 1767
winter. Vance, G.P., (1980, 27p.) Winter. Vance, G.P., (1980, 27p.) Wintions caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR \$1-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR \$2-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) MP 1695 Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclant, J.C., et al., (1984, p.627-638) Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) SR \$4-65 Icebreaking by gas biasting. Mellor, M., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.39-	Parker, B.C., et al. [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al. [1983, 16p.] CR 83-96 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. [1984, 41p.] CR 84-95 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. [1984, p.2087-2095] MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. [1984, 7p.] CR 84-15 Structure of ice in the central part of the Ross Ice Shelf, Antarctica. Zotlkov, I.A., et al. [1985, p.39-44]	On the decay and retreat of the ice cover in the summer MIZ. Maykut, 0.4., 1984, p.15-22; MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., [1984, p.9-14] MP 1779 On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., [1984, p.23-29] MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., [1984, p.63-71] MP 1784 Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., [1984, p.73-76] Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., [1984, p.85-101] MOdel simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., [1984, p.170-176, MP 1767 Modeling intake peformance under frazil ice conditions.
winter. Vance, G.P., (1980, 27p.) SR 89-32 Vibrations caused by ship traffic on an ice-covered waterway, Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 82-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) CR 84-04 Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) SR 84-65 Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p. 309-318)	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107- 109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al., [1983, 16p.] Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al., [1984, 41p.] CR 84-95 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al., [1984, p.2087-2095] MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al., [1984, 7p.] Structure of ice in the central part of the Ross Ice Shelf, Antarctica. Zotikov, I.A., et al., [1985, p.39-44] MP 2110 Physical properties of the sea ice cover. Weeks, W.F.,	On the decay and retrest of the ice cover in the summer MIZ. Maykut, C.A., (1984, p.15-22) MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., (1984, p.9-14) MP 1779 On the role of ice interaction in marginal ice zone dynamics. Lepptranta, M., et al., (1984, p.3-2-9) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) MP 1784 Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) MP 1785 Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) Model simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176) Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.59-565) MP 1797
winter. Vance, G.P., (1980, 27p.) Winter. Vance, G.P., (1980, 27p.) Winterloss caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 82-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) MP 1605 Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., 1984, 28p.) Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) MP 1627 Surfacing submarines through ice. Assur, A., (1984, p.309-318) Workshop on Ice Penetration Technology, Hanover, NH,	Parker, B.C., et al. [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al. [1983, 16p.] CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. [1984, 41p.] CR 84-05 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. [1984, p.2087-2095] MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. [1984, 7p.] CR 84-15 Structure of ice in the central part of the Ross Ice Shelf, Antarctica. Zotlkov, I.A., et al. [1985, p.39-444] MP 2110 Physical properties of the sea ice cover. Weeks, W.F., [1986, p.87-102] Ice configurations.	On the decay and retreat of the ice cover in the summer MIZ. Maykut, 0.4., 1984, p.15-22; MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., [1984, p.9-14] MP 1779 On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., [1984, p.23-29] MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., [1984, p.63-71] MP 1784 Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., [1984, p.73-76] Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., [1984, p.85-101] MOdel simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., [1984, p.170-176, MP 1767 Modeling intake peformance under frazil ice conditions.
winter. Vance, G.P., (1980, 27p.) Winter. Vance, G.P., (1980, 27p.) Wintions caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 82-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) CR 84-04 Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) SR 84-65 Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p. 309-318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) SR 84-33 Mechanics of ice cover breakthrough. Kerr, A.D., (1984, 298, 1984, 345p.)	Parker, B.C., et al., [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter ace ice in the Weddell Sea. Clarke, D.B., et al., [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al., [1983, 16p.] Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al., [1984, 41p.] CR 84-95 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al., [1984, p.2087-2095] MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al., [1984, 7p.] Structure of ice in the central part of the Ross Ice Shelf, Antarctica. Zotikov, I.A., et al., [1985, p.39-44] Physical properties of the sea ice cover. Weeks, W.F., [1986, p.87-102] Ice conspression Application of ice engineering and research to Great Lakes	On the decay and retrest of the ice cover in the summer MIZ. Maykut, C.A., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamics. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) Mchanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.63-71) Mchanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Mchanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Mchanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.85-101) MMP 1785 Mchanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.170-176) Mchanism for floe clustering in the marginal ice zone. Lepptranta, M., Jr., (1984, p.59-563) MP 1797 Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) MIZEX 83 mesoscale sea ice dynamica: initial analysis. Hi-
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) GR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.), CR 82-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) MP 1605 Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) Icebreaking by gas blasting. Mellor, M., (1984, p.93-102), MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.309-318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) SR 84-33 Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262)	Parker, B.C., et al. [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al. [1983, 16p.] CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. [1984, 41p.] CR 84-05 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. [1984, p.2087-2095] MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. [1984, 7p.] CR 84-15 Structure of ice in the central part of the Ross Ice Shelf, Antarctica. Zotlkov, I.A., et al. [1985, p.39-444] MP 2110 Physical properties of the sea ice cover. Weeks, W.F., [1986, p.87-102] Ice configurations.	On the decay and retreat of the ice cover in the summer MIZ. Maykut, CA., (1984, p.15-22) MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., (1984, p.9-14) MP 1779 On the role of ice interaction in marginal ice zone dynamical Leppiranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, B.L., et al., (1984, p.63-71) MP 1784 Mechanism for floe clustering in the marginal ice zone. Leppiranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) MM 1712 Model simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176) MM 1767 Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) Reservoir bank crosion caused by ice. Gatto, L.W., (1984, p.203-214) MIZEX 83 measocale sea ice dynamica: initial analysis. Hibter, W.D., III, et al., (1984, p.19-28) MP 1811
winter. Vance, G.P., (1980, 27p.) Winter. Vance, G.P., (1980, 27p.) Wintions caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 82-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) CR 84-04 Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) SR 84-65 Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p. 309-318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) SR 84-33 Mechanics of ice cover breakthrough. Kerr, A.D., (1984, 298, 1984, 345p.)	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeka, W.F., (1982, 27p.) SR 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., (1982, p.107-109) MP 1669 Chemical fractionation of brine in the McMurdo loc Shelf. Cragin, J.H., et al., (1983, 16p.) CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al., (1984, 41p.) CR 84-85 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al., (1984, p.2087-2095) Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al., (1984, 7p.) Structure of ice in the central part of the Ross Ice Shelf, Antarctica. Zotikov, I.A., et al., (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeka, W.F., (1986, p.87-102) Ice centuressies Application of ice engineering and research to Great Lakes problems. Freitag, D.R., (1972, p.131-138) MP 1615 Messuring the uniaxial compressive strength of ice. Haynes,	On the decay and retreat of the ice cover in the summer MIZ. Maykut, G.A., [1984, p.15-22] MB 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., [1984, p.9-14] MP 1770 On the role of ice interaction in marginal ice zone dynamica. Leppiranta, M., et al., [1984, p.23-29] MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., [1984, p.63-71] Mechanism for floe clustering in the marginal ice zone. Leppiranta, M., et al., [1984, p.73-76] Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., [1984, p.85-101] Model simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., [1984, p.170-176] Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) MP 1767 Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) MP 1797 Reservoir bank erosion caused by ice. Gatto, L.W., [1984, p.203-214] MIZEX 83 mesoscale sea ice dynamics: initial analysis. Hibler, W.D., III, et al., [1984, p.19-28] MP 1811 MIZEX 84 mesoscale sea ice dynamics: post operations report. Hibber, W.D., III, et al., [1984, p.19-28]
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR \$1-65 Breaking ice with explosives. Mellor, M., (1982, 64p.), CR \$2-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclanux, J.C., et al., (1984, p.627-638) Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) Surfacing submarines through ice. Assur, A., (1984, p.93-102), MP 1627 Surfacing submarines through ice. Assur, A., (1984, p.309-318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) SR \$4-33 Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR \$6-04 Level ice breaking by a simple wedge. Tatinclaux, J.C.,	Parker, B.C., et al. [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeka, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al, [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdol ice Shelf. Cragin, J.H., et al, [1983, 16p.] CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al, [1984, 41p.] CR 84-85 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al, [1984, P.0087-2095] Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al, [1984, 7p.] CR 84-15 Structure of ice in the central part of the Ross Ice Shelf, Antarctics. Zotlkov, I.A., et al, [1985, p.39-44] MP 2110 Physical properties of the sea ice cover. Weeka, W.F., [1986, p.87-102] Ice conspression Application of ice engineering and research to Great Lakes problems. Prefitag, D.R., [1972, p.131-138] Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al, [1977, p.213-223] MP 1627	On the decay and retreat of the ice cover in the summer MIZ. Maykut, CA., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) MP 1784 Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) MOdel simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176, MP 1767 Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) MP 1797 MEZEX 83 mesoscale sea ice dynamica: initial analysis. Hiber, W.D., III., et al., (1984, p.19-28) MP 1811 MIZEX 84 mesoscale sea ice dynamics: post operations report. Hibler, W.D., III., et al., (1984, p.66-69) MP 1287
winter. Vance, G.P., (1980, 279.) Winter. Vance, G.P., (1980, 279.) Wintions caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 279.) Breaking ice with explosives. Mellor, M., (1982, 649.) CR \$2-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 129.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1910 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 289.) SR \$4-65 Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.309-318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) MP 1999 Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR \$5-04 Level ice breaking by a simple wedge. Tatinclaux, J.C., (1985, 46p.) CR \$5-22	Parker, B.C., et al. [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al. [1983, 16p.] CR 83-96 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. [1984, 41p.] CR 84-95 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. [1984, p.2087-2095] MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. [1984, 7p.] CR 84-15 Structure of ice in the central part of the Rose Ice Shelf, Antarctica. Zotlkov, I.A., et al. [1985, p.39-44] MP 2110 Physical properties of the sea ice cover. Weeks, W.F., [1986, p.87-102] Ice centipression Application of ice engineering and research to Great Lakes problems. Freitag, D.R., [1972, p.131-138] MP 1615 Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al. [1977, p.213-223] Ice centifices	On the decay and retrest of the ice cover in the summer MIZ. Maykut, C.A., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamics. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) Mcchanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) MOdel simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176; MP 1772 Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) Reservoir bank erosion caused by ice. Gatto, L.W., 1984, p.203-214; MP 1797 MIZEX 83 mesoscale sea ice dynamics: initial analysis. Hiber, W.D., III, et al., (1984, p.19-28) MP 1811 MIZEX 84 mesoscale sea ice dynamics: post operations report. Hibler, W.D., III, et al., (1984, p.66-69) MP 1257 Offshore Mechanics and Arctic Engineering Symposium, 4th,
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR \$1-65 Breaking ice with explosives. Mellor, M., (1982, 64p.), CR \$2-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclanux, J.C., et al., (1984, p.627-638) Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) Surfacing submarines through ice. Assur, A., (1984, p.93-102), MP 1627 Surfacing submarines through ice. Assur, A., (1984, p.309-318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) SR \$4-33 Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR \$6-04 Level ice breaking by a simple wedge. Tatinclaux, J.C.,	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., (1982, 27p.) SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. (1982, p.107-109) MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al. (1983, 16p.) CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. (1984, 41p.) CR 84-08 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. (1984, p.2087-2095) MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. (1984, 7p.) CR 84-15 Structure of ice in the central part of the Rose Ice Shelf, Antarctica. Zotlkov, I.A., et al., (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeks, W.F., (1986, p.87-102) Ice compressive Application of ice engineering and research to Great Lakes problems. Freitag, D.R., (1972, p.131-138) MP 1615 Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al., (1977, p.213-223) Ice conditions Ice dynamics, Canadian Archipelago and adjacent Arctic basin. Ramseler, R.O., et al., (1975, p.853-877)	On the decay and retreat of the ice cover in the summer MIZ. Maykut, CA., (1984, p.15-22) MP 1780 Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., (1984, p.9-14) MP 1779 On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) MP 1784 Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical certaintes. Gerard, R., et al., (1984, p.85-101) MP 1785 Ice-desired flood frequency analysis: application of analytical certaintes. Gerard, R., et al., (1984, p.85-101) MP 1772 Model simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176, MP 1767 Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) MP 1767 MP 1787 MEZEX 83 mesoscale sea ice dynamics: initial analysis. Hiber, W.D., III, et al., (1984, p.19-28) MP 1811 MIZEX 84 mesoscale sea ice dynamics: post operations report. Hibler, W.D., III, et al., (1984, p.66-69) MP 1287 Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. (1985, 2 vola.) MP 2105 Unified degree-day method for river ice cover thickness simu-
winter. Vance, G.P., (1980, 27p.) SR 89-32 Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.), CR 22-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., 1984, 28p.) Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) Surfacing submarines through ice. Assur, A., (1984, p.93-103) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984. (1984, 345p.) MCP 1998 Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984. (1984, 345p.) MCP 1997 Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR 88-94 Level ice breaking by a simple wedge. Tatinclaux, J.C., (1985, 46p.) Some affects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.328-533) MP 2036 Ice floe distribution in the wate of a simple wedge. Tatinclaux, J.C., (1985, 13p.) RF 2036 Ice floe distribution in the wate of a simple wedge. Tatinclaux, J.C., (1985, p.328-533) MP 2036	Parker, B.C., et al. [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al. [1983, 16p.] CR 84-05 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. [1984, 41p.] CR 84-05 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. [1984, p.2087-2095] MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al., [1984, 7p.] CR 84-15 Structure of ice in the central part of the Ross Ice Shelf, Antarctica. Zotlkov, I.A., et al., [1985, p.39-44] MP 2110 Physical properties of the sea ice cover. Weeks, W.F., [1986, p.87-102] Ice contiperselsea Application of ice engineering and research to Great Lakes problems. Preitag, D.R., [1972, p.131-138] MP 1615 Messuring the uniaxial compressive strength of ice. Haynes, I.D., et al., [1977, p.213-223] MP 1627 Ice considerations Ice dynamics, Canadian Archipelago and adjacent Arctic basin. Ramsetier, R.O., et al., [1975, p.853-877] MP 1585	On the decay and retrest of the ice cover in the summer MIZ. Maykut, C.A., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamics. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) Mchanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ioe-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) Model simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176, MP 1767 Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.359-563) MP 1797 MIZEX 83 mesoscale sea ice dynamics: initial analysis. Hiber, W.D., III, et al., (1984, p.19-28) MP 1811 MIZEX 84 mesoscale sea ice dynamics: nost operations report. Hibler, W.D., III, et al., (1984, p.19-28) Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985, (1985, 2 vols.) Unified degree-day method for river ice cover thickness simulation. Shen, H.T., et al., [1985, p.54-62) MP 2865
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR \$1-65 Breaking ice with explosives. Mellor, M., (1982, 64p.), CR \$2-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.93-103) MP 1998 Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR \$8-25 Some effects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.328-533) MP 2036 Ice floe distribution in the wake of a simple wedge. Tatinclaux, J.C., (1985, 158) MP 2038	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeka, W.F., (1982, 27p.) SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. (1982, p.107-109) Chemical fractionation of brine in the McMurdol ice Shelf. Cragin, J.H., et al. (1983, 16p.) CR 83-96 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. (1984, 41p.) CR 84-85 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. (1984, p.2087-2095) Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. (1984, 7p.) CR 84-15 Structure of ice in the central part of the Ross Ice Shelf, Antarctica. Zotikov, I.A., et al., (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeka, W.F., (1986, p.87-102) Ice congression Application of ice engineering and research to Great Lakes problems. Freitag, D.R., (1972, p.131-138) Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al., (1977, p.213-223) MP 1615 Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al., (1977, p.213-223) MP 1585 Statistical variations in Arctic sea ice ridging and deformation	On the decay and retreat of the ice cover in the summer MIZ. Maykut, CA., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamical Leppiranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) Mechanism for floe clustering in the marginal ice zone. Leppiranta, M., et al., (1984, p.73-76) MP 1785 Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) Model simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176) Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.59-563) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) MIZEX 83 mesoscale sea ice dynamics: initial analysis. Hiber, W.D., III, et al., (1984, p.66-69) MP 1837 Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. (1985, 2 vols.) MP 2057 Unified degree-day method for river ice cover thickness simulation. Shen, H.T., et al., (1985, p.54-62) MP 2065 Propulsion tests in level ice on a model of a 140-ft WTGB
winter. Vance, G.P., (1980, 27p.) SR 89-32 Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.), CR 22-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., 1984, 28p.) Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) Surfacing submarines through ice. Assur, A., (1984, p.93-103) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984. (1984, 345p.) MCP 1998 Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984. (1984, 345p.) MCP 1997 Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR 88-94 Level ice breaking by a simple wedge. Tatinclaux, J.C., (1985, 46p.) Some affects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.328-533) MP 2036 Ice floe distribution in the wate of a simple wedge. Tatinclaux, J.C., (1985, 13p.) RF 2036 Ice floe distribution in the wate of a simple wedge. Tatinclaux, J.C., (1985, p.328-533) MP 2036	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeka, W.F., (1982, 27p.) SR 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., (1982, p.107-109) MP 1669 Chemical fractionation of brine in the McMurdo loc Shelf. Cragin, J.H., et al., (1983, 16p.) CR 83-96 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al., (1984, 41p.) CR 84-95 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al., (1984, p.2087-2095) Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al., (1984, 7p.) Structure of ice in the central part of the Ross loc Shelf, Antarctica. Zotikov, I.A., et al., (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeka, W.F., (1986, p.87-102) Ice centpression Application of ice engineering and research to Great Lakes problems. Freitag, D.R., (1972, p.131-138) MP 1615 Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al., (1977, p.213-223) MP 1627 Ice conditions Ice dynamics, Canadian Archipelago and adjacent Arctic basin. Ramseier, R.O., et al., (1975, p.15-16) MP 1585 Statistical variations in Arctic sea ice ridging and deformation rates. Hibler, W.D., III, (1975, p.15-16) MP 1585 Winter thermal structure and ice conditions on Lake Cham-	On the decay and retrest of the ice cover in the summer MIZ. Maykut, C.A., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamics. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) Mr 1784 Mcchanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.63-71) Mr 1785 Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) Mr 1785 Model simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176, MP 1767 Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.359-563) Mr 1797 MIZEX 83 mesoscale sea ice dynamics: initial analysis. Hiber, W.D., III, et al., (1984, p.19-28) Mr 1811 MIZEX 84 mesoscale sea ice dynamics: nost operations report. Hibler, W.D., III, et al., (1984, p.19-28) Unified degree-day method for river ice cover thickness simulation. Shen, H.T., et al., (1985, p.54-62) Nr 200-100-1000 Nr 200-1000 Nr 200-1000 Mr 2000 Mr 2000 Mr 2000
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 62-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.93-103) MC 1998 Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) Mcchanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR 85-22 Some effects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.328-533) MC 2038 Design and model testing of a river ice prow. Tatinclaux, J.C., (1985, p.236-52) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.137-150) MP 2038 Ice breaking	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeka, W.F., (1982, 27p.) SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. (1982, p.107-109) Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al. (1983, 16p.) CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. (1984, 41p.) CR 84-05 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. (1984, p.2087-2095) Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. (1984, 7p.) CR 84-15 Structure of ice in the central part of the Ross Ice Shelf, Antarctics. Zotlkov, I.A., et al. (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeka, W.P., (1986, p.87-102) Ice congression Application of ice engineering and research to Great Lakes problems. Prefitag. D.R., (1972, p.131-138) Messuring the uniaxial compressive strength of ice. Lakes problems. Prefitag. D.R., (1972, p.131-138) Messuring the uniaxial compressive strength of ice. Raynes, P.D., et al. (1977, p.213-223) MP 1615 Statistical variations in Arctic sea ice ridging and deformation rates. Hibler, W.D., III, (1975, p.131-176) Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.E., (1976, 22p.) CR 76-13	On the decay and retreat of the ice cover in the summer MIZ. Maykut, G.A., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.23-29) MP 1779 On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.63-71) MP 1784 Mechanism for floe clustering in the marginal ice zone. Andreas, E.L., et al., (1984, p.63-76) MP 1785 Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) MOdel simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176, MP 1767 Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) MP 1767 MCZEX 83 mesoscale sea ice dynamica: initial analysis. Hiber, W.D., III, et al., (1984, p.19-28) MP 1811 MIZEX 84 mesoscale sea ice dynamica: initial analysis. Hiber, W.D., III, et al., (1984, p.66-69) MP 1287 Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985, (1985, 2 vola.) MP 2867 Stropulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR 85-04 Kadluk ice stress measurement program. Johnson, J.B., et al., (1985, p.88-100) MP 1889
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) Breaking ice with explosives. Mellor, M., (1982, 64p.) CR \$1-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) Protection of offahore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, p.627-638) Surfacing submarines through ice. Assur, A., (1984, p.39-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.39-318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984. (1984, 345p.) MR 84-33 Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR 85-04 Level ice breaking by a simple wedge. Tatinclaux, J.C., (1985, 46p.) Some effects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.528-533) Ice floe distribution in the wake of a simple wedge. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.137-150) Ice breakup Loc-cratering experiments Blair Lake, Alaska. Kurtz, M.K.,	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., (1982, 27p.) SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. (1982, p.107-109) MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al. (1983, 16p.) CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. (1984, 41p.) CR 84-08 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. (1984, p.2087-2095) MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. (1984, 7p.) CR 84-15 Structure of ice in the central part of the Rose Ice Shelf, Antarctica. Zotlkov, I.A., et al. (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeks, W.F., (1986, p.87-102) Ice congression Application of ice engineering and research to Great Lakes problems. Freitag, D.R., (1972, p.131-138) MP 1615 Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al. (1977, p.213-223) Ice conditions Ice dynamics, Canadian Archipelago and adjacent Arctic basin. Ramseier, R.O., et al., (1975, p.853-877) MP 1585 Statistical variations in Arctic sea ice ridging and deformation rates. Hibber, W.D., III, (1975, p.11-16) MP 850 Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.E., (1976, 22p.) CR 76-13 Dynamics of near-shore ice. Weeks, W.F., et al., (1976,	On the decay and retrest of the ice cover in the summer MIZ. Maykut, C.A., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical catimates. Gerard, R., et al., (1984, p.85-101) MOdel simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176) MOdeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) MP 1797 MIZEX 83 mesoscale sea ice dynamica: initial analysis. Hibler, W.D., III., et al., (1984, p.19-28) MP 1811 MIZEX 84 mesoscale sea ice dynamics: post operations report. Hibler, W.D., III., et al., (1984, p.19-28) Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. (1985, 2 vola.) Unified degree-day method for river ice cover thickness simulation. Shez, H.T., et al., (1985, p.38-62) MP 2065 Propulsion tests in level ice on a model of a 140-ft WTOB icebreaker. Tatinclaux, J.C., (1985, 1997, CR 83-04 Kadluk ice stress measurement program. Johnson, J.B., et al., (1985, p.88-100) Ice conditions on the Ohio and Illinois rivers, 1972-1985.
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) Breaking ice with explosives. Mellor, M., (1982, 64p.) CR \$1-65 Breaking ice with explosives. Mellor, M., (1983, p.310-322) Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) MP 1695 Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, p.627-638) Ice presistance tests on two models of the WTGB icebreaker. Stubstad, J., et al., (1984, p.39-102) Surfacing submarines through ice. Assur, A., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.309-318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984. (1984, 345p.) SR \$4-33 Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 46p.) Some effects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.328-533) Design and model testing of a river ice prow. Tatinclaux, J.C., (1985, p.622-629) MP 2036 Ice breaking Ice-cratering experiments Blair Lake, Alaska. Kurtz, M.K., et al., (1966, Various pagings) Yukon River breaking 1976. Johnson, P., et al., (1977, 1978, 1977)	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeka, W.F., (1982, 27p.) SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. (1982, p.107-109) Chemical fractionation of brine in the McMurdo Ice Sheft, Cragin, J.H., et al. (1983, 16p.) CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. (1984, 41p.) CR 84-05 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. (1984, p.2087-2095) Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. (1984, 7p.) CR 84-15 Structure of ice in the central part of the Rose Ice Sheff, Antarctics. Zotikov, I.A., et al., (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeka, W.P., (1986, p.87-102) Ice congression Application of ice engineering and research to Great Lakes problems. Freitag, D.R., (1972, p.131-138) MP 1615 Messuring the uniaxial compressive strength of ice. Haynes, P.D., et al., (1977, p.213-223) MP 1627 Ice conditions Ice dynamics, Canadian Archipelago and adjacent Arctic basin. Ramsetier, R.O., et al., (1975, p.853-877) MP 1585 Statistical variations in Arctic sea ice ridging and deformation rates. Hibler, W.D., III, (1975, p.J1-J16) Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.E., (1976, 22p.) CR 76-13 Dynamics of near-shore ice. Weeks, W.F., et al., (1976, MP 922) Sea hee conditions in the Arctic. Weeka, W.F., et al., (1976, MP 922)	On the decay and retreat of the ice cover in the summer MIZ. Maykut, CA., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) MR 1784 Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) MOdel simulation of 20 years of northern hemisphere soa-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176, MP 1767 Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) MR 1797 MEZEX 83 mesoccale sea ice dynamica: initial analysis. Hiber, W.D., III., et al., (1984, p.19-28) MP 1811 MIZEX 84 mesoccale sea ice dynamics: post operations report. Hibler, W.D., III., et al., (1984, p.66-69) MP 1287 Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. (1985, 2 vols.) MP 2367 Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. (1985, 2 vols.) MR 1859 Cratical degree-day method for river ice cover thickness simulation. Shen, H.T., et al., (1985, p.54-62) MP 2365 Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinciaux, J.C., (1985, 139-) CR 85-04 Kadluk ice stress measurement program. Johnson, J.B., et al., (1985, p.88-100) MP 1997 Loger Delaware River ice control—a case study. Zufelt, MP 1914 Upper Delaware River ice control—a case study. Zufelt,
winter. Vance, G.P., (1980, 27p.) Winter. Vance, G.P., (1981, 27p.) Results and the explosives of the winter way. Haynes, F.D., et al., (1981, 27p.) Results are with explosives. Mellor, M., (1982, 64p.) Results are with explosives. Mellor, M., (1982, 64p.) Results are with explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. MP 1695 Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., 1984, 28p.) Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) Surfacing submarines through ice. Assur, A., (1984, p.93-103) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984. (1984, 345p.) MC handles of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) Level ice breaking by a simple wedge. Tatinclaux, J.C., (1985, 46p.) Some effects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.528-533) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1	Parker, B.C., et al. [1981, p.79-81] MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. [1982, p.107-109] MP 1669 Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al., [1983, 16p.] CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al., [1984, 41p.] CR 84-05 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al., [1984, p.2087-2095] MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al., [1984, 7p.] CR 84-15 Structure of ice in the central part of the Rose Ice Shelf, Antarctica. Zotikov, I.A., et al., [1985, p.39-444] MP 2110 Physical properties of the sea ice cover. Weeks, W.F., [1986, p.87-102] Ice configuration Application of ice engineering and research to Great Lakes problems. Freitag, D.R., [1972, p.131-138] MP 1615 Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al., [1977, p.213-223] Ice conditions In Arctic sea ice ridging and deformation rates. Hibber, W.D., III, [1975, p.353-877] MP 1585 Statistical variations in Arctic sea ice ridging and deformation rates. Hibber, W.D., III, [1975, p.11-16] MP 830 Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.E., [1976, 22p.] CR 76-13 Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.267-275] Sea lee conditions in the Arctic. Weeks, W.F., et al., [1976, p.173-205]	On the decay and retrest of the ice cover in the summer MIZ. Maykut, C.A., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical catimates. Gerard, R., et al., (1984, p.85-101) MOdel simulation of 20 years of northern hemisphere soa-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176) Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.59-563) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.20-214) MIZEX 83 mesoscale sea ice dynamica: initial analysis. Hibler, W.D., III., et al., (1984, p.19-28) MP 1811 MIZEX 84 mesoscale sea ice dynamics: post operations report. Hibler, W.D., III., et al., (1984, p.66-69) Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. (1985, 2 vola.) Unified degree-day method for river ice cover thickness simulation. Shen, H.T., et al., (1985, p.85-62) Propulsion tests in level ice on a model of a 140-ft WTGB icebreakers. Tatinclaux, J.C., (1985, 199-) CR 85-04 Kadluk ice stress measurement program. Johnson, J.B., et al., (1985, p.85-100) lee conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., (1985, 760-770) MP 2005
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR \$1-65 Breaking ice with explosives. Mellor, M., (1982, 64p.), CR \$2-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.93-103, 318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) CR \$8-43 Ice floe distribution in the wake of a simple wedge. Tatinclaux, J.C., (1985, 64p.) Some effects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.528-533) MP 2036 Ice floe distribution in the wake of a simple wedge. Tatinclaux, J.C., (1986, p.137-150) Ice breakup Ico-cratering experiments Blair Lake, Alaska. Kurtz, M.K., et al., (1966, Various pagings) Yukon River breakup 1976. Johnson, P., et al., (1977, MP 960 toe breakup on the Chena River 1975 and 1976. McFadden,	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeka, W.F., (1982, 27p.) SR 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. (1982, p.107-109) Chemical fractionation of brine in the McMurdo ice Shelf. Cragin, J.H., et al. (1983, 16p.) CR 83-96 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. (1984, 41p.) CR 84-85 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. (1984, p.2087-2095) Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. (1984, 7p.) CR 84-15 Structure of ice in the central part of the Rose Ice Shelf, Antarctica. Zotikov, I.A., et al., (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeks, W.F., (1986, p.87-102) Ice compressive Application of ice engineering and research to Great Lakes problems. Freitag, D.R., (1972, p.131-138) Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al., (1977, p.213-223) MP 1627 Ice conditions Ice dynamics, Canadian Archipelago and adjacent Arctic basin. Ramseier, R.O., et al., (1975, p.853-877) MP 1585 Statistical variations in Arctic sea ice ridging and deformation rates. Hibber, W.D., III, (1975, p.131-136) Winter thermal structure and ice conditions on Lake Champlain, Vermout. Bates, R.E., (1976, 22p.) CR 76-13 Dynamics of near-shore ice. Weeks, W.F., et al., (1976, p.167-275) MP 922 Sea ice conditions in the Arctic. Weeks, W.F., et al., (1976, p.173-205) MP 910 Remote sensing of frazil and brash ice in the St. Lawrence	On the decay and retreat of the ice cover in the summer MIZ. Maykut, G.A., [1984, p.15-22] Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., [1984, p.9-14] On the role of ice interaction in marginal ice zone dynamical Leppiranta, M., et al., [1984, p.23-29] MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., [1984, p.63-71] Mechanism for floe clustering in the marginal ice zone. Leppiranta, M., et al., [1984, p.73-76] Ince-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., [1984, p.85-101] Model simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., [1984, p.170-176] Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) RMP 1797 Meservoir bank erosion caused by ice. Gatto, L.W., [1984, p.203-214] MIZEX 83 mesoscale sea ice dynamica: initial analysis. Hiber, W.D., III, et al., [1984, p.66-69] MP 1811 MIZEX 84 mesoscale sea ice dynamics: post operations report. Hibler, W.D., III, et al., [1984, p.66-69] Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. [1985, 2 vola.] Unified degree-day method for river ice cover thickness simulation. Shen, H.T., et al., [1985, p.54-62) MP 2165 Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., [1985, 13p.] Kadluk ice stress measurement program. Johnson, J.B., et al., [1985, p.88-100] Ice conditions on the Ohio and Illinois rivers, 1972-1985. MP 1914 Upper Delaware River ice control—a case study. Zufelt, J.E., et al., [1986, p.760-770] Remote seasing of the Arctic seas. Weeks, W.F., et al.
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) Breaking ice with explosives. Mellor, M., (1982, 64p.), CR 24-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.B., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., 1984, 28p.) Icebreaking by gas blasting. Mellor, M., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.309-316) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984, (1984, 345p.) Mcchanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 13p.) Level ice breaking by a simple wedge. Tatinclaux, J.C., (1985, 46p.) Some effects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.528-533) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) NP 2038 Levelipe God Stribution in the wate of a simple wedge. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) NP 2038 Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) NP 2038 Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) NP 2038 Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) NP 2038 Design and model testing of a river ice prow. Tatinclaux, J.C., (1986, p.622-629) NP 2036 Le breakup Level to breakup on the Chena River 1975 and 1976. McPadden, T., et al.	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeka, W.F., (1982, 27p.) SR 82-28 Physical, chemical and biological properties of winter sea ice in the Weddeli Sea. Clarke, D.B., et al., (1982, p.107-109) MP 1669 Chemical fractionation of brine in the McMurdo loc Shelf. Cragin, J.H., et al., (1983, 16p.) CR 83-96 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al., (1984, 41p.) CR 84-95 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al., (1984, p.2087-2095) Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al., (1984, 7p.) Structure of ice in the central part of the Ross loc Shelf, Antarctica. Zotikov, I.A., et al., (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeka, W.P., (1986, p.87-102) Ice centipression Application of ice engineering and research to Great Lakes problems. Freitag, D.R., (1972, p.131-138) MP 1615 Messuring the uniaxial compressive strength of ice. Haynes, F.D., et al., (1977, p.213-223) MP 1627 Ice conditions Ice dynamics, Canadian Archipelago and adjacent Arctic basin. Ramseier, R.O., et al., (1975, p.13-136) MP 1627 Ice conditions Statistical variations in Arctic sea ice ridging and deformation rates. Hibler, W.D., III, (1975, p.13-136) MP 1885 Statistical variations in Arctic sea ice ridging and deformation rates. Hibler, W.D., III, (1975, p.13-16) MP 292 Sea loe conditions in the Arctic. Weeks, W.F., et al., (1976, p.257-275) MP 910 Remote sensing of frazil and brash ice in the St. Lawrence River. Dean, A.M., Jr., (1977, 199.) Remote sensing of accumulated frazil and brash ice. Dean,	On the decay and retrest of the ice cover in the summer MIZ. Maykut, C.A., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical cestimates. Gerard, R., et al., (1984, p.85-101) MOdel simulation of 20 years of northern hemisphere sea-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176) Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.55-563) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) MIZEX 83 mesoscale sea ice dynamics: initial analysis. Hiber, W.D., III., et al., (1984, p.19-28) MP 1787 Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. (1985, 2 vola.) Unified degree-day method for river ice cover thickness simulation. Shen, H.T., et al., (1985, p.54-62) Propulsion tests in level ice on a model of a 140-th WTGB icebreaker. Tatinclaux, J.C., (1985, 1995). CR 83-04 Kadluk ice stress measurement program. Johnson, J.B., et al., (1985, p.85-641) Upper Delaware River ice control—a case study. Zufelt, J.B., et al., (1986, p.59-641) Offshore Mechanics and Arctic Engineering Symposium, 5th, MP 2105 Remote sensing of the Arctic seas. Weeks, W.F., et al., (1986, p.5)-641 Offshore Mechanics and Arctic Engineering Symposium, 5th, MP 2105
winter. Vance, G.P., (1980, 27p.) Winteriors caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al., (1981, 27p.) CR 81-65 Breaking ice with explosives. Mellor, M., (1982, 64p.) CR 82-40 Protection of offshore arctic structures by explosives. Mellor, M., (1983, p.310-322) Navigation ice booms on the St. Marys River. Perham, R.R., (1984, 12p.) Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, p.627-638) Ice presistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) Surfacing submarines through ice. Assur, A., (1984, p.93-102) MP 1827 Surfacing submarines through ice. Assur, A., (1984, p.309-318) Workshop on Ice Penetration Technology, Hanover, NH, June 12-13, 1984. (1984, 345p.) SR 84-33 Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., (1985, 46p.) Some effects of friction on ice forces against vertical structures. Kato, K., et al., (1986, p.328-533) Ice floe distribution in the wake of a simple wedge. Tatinclaux, J.C., (1985, p.622-629) MP 2036 Ice floe distribution in the wake of a simple wedge. Tatinclaux, J.C., (1986, p.137-150) Ice breaking Ice-cratering experiments Blair Lake, Alaska. Kurtz, M.K., et al., (1966, Various pagings) Yukon River breakup 1976. Johnson, P., et al., (1977, p.592-596) Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., (1977, 44p.) CR 87-14	Parker, B.C., et al. (1981, p.79-81) MP 1541 Physical properties of the ice cover of the Greenland Sea. Weeka, W.F., (1982, 27p.) SE 82-28 Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al. (1982, p.107-109) MP 1669 Chemical fractionation of brine in the McMurdo Ice Sheft, Cragin, J.H., et al. (1983, 16p.) CR 83-06 Morphology and ecology of diatoms in sea ice from the Weddell Sea. Clarke, D.B., et al. (1984, 41p.) CR 84-05 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al. (1984, p.2087-2095) MP 1701 Baseline acidity of ancient precipitation from the South Pole. Cragin, J.H., et al. (1984, 7p.) CR 84-15 Structure of ice in the central part of the Rose Ice Sheff, Antarctica. Zotlkov, I.A., et al., (1985, p.39-44) MP 2110 Physical properties of the sea ice cover. Weeka, W.F., (1986, p.87-102) Ice congression Application of ice engineering and research to Great Lakes problems. Preitag, D.R., (1972, p.131-138) MP 1615 Measuring the uniaxial compressive strength of ice. Haynes, F.D., et al., (1977, p.213-223) MP 1627 Ice conditions Ice dynamics, Canadian Archipelago and adjacent Arctic basin. Ramseier, R.O., et al., (1975, p.353-877) MP 1585 Statistical variations in Arctic sea ice ridging and deformation rates. Hibler, W.D., III, (1975, p.J1-J16) MP 850 Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.E., (1976, 22p.) CR 76-13 Dynamics of near-shore ice. Weeks, W.F., et al., (1976, p.257-275) Sea loe conditions in the Arctic. Weeka, W.F., et al., (1976, p.173-205) Remote sensing of frazil and brash ice in the St. Lawrence CR 77-08	On the decay and retreat of the ice cover in the summer MIZ. Maykut, C.A., (1984, p.15-22) Bast Greenland Sea ice variability in large-scale model simulations. Walsh, J.B., et al., (1984, p.9-14) On the role of ice interaction in marginal ice zone dynamica. Lepptranta, M., et al., (1984, p.23-29) MP 1781 Drag coefficient across the Antarctic marginal ice zone. Andreas, E.L., et al., (1984, p.63-71) MR 1784 Mechanism for floe clustering in the marginal ice zone. Lepptranta, M., et al., (1984, p.73-76) Ice-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., (1984, p.85-101) MP 1712 Model simulation of 20 years of northern hemisphere soa-ice fluctuations. Walsh, J.E., et al., (1984, p.170-176, MP 1767) Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., (1984, p.559-563) MP 1797 MEZEX 83 mesoscale sea ice dynamics: initial analysis. Hiber, W.D., III, et al., (1984, p.19-28) MIZEX 84 mesoscale sea ice dynamics: post operations report. Hibler, W.D., III, et al., (1984, p.66-69) MP 1287 Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. (1985, 2 vola.) MP 2165 Unified degree-day method for river ice cover thickness simulation. Shea, H.T., et al., (1985, p.84-62) MP 2165 Fropulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinciaux, J.C., (1985, 13p.) CR 85-04 Kadluk ice stress measurement program. Johnson, J.B., et al., (1985, p.85-681) MP 1899 Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., (1985, p.856-861) MP 1909 Remote sensing of the Arctic seas. Weeks, W.F., et al., (1986, p.760-770)

Ice (construction material)	Dating annual layers of Greenland ice. Langway, C.C., Jr.,	West antarctic sea ice. Ackley, S.F., [1984, p.88-95]
Engineering properties of sea ice. Schwarz, J., et al. [1977, p.499-53]	et al, [1977, p.302-306] MIP 1094	MP 1918
Role of research in developing surface protection measures	Changes in the composition of atmospheric precipitation. Cragin, J.H., et al, [1977, p.617-631] MIP 1079	Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al, (1984,
for the Arctic Slope of Alaska. Johnson, P.R., [1978,	Primary productivity in sea ice of the Weddell region. Ack-	28p. ₁ SE 84-65
p.202-205j MP 1068	ley, S.F., et al, [1978, 17p.] CR 78-19	Nitrogen removal in wastewater ponds. Reed, S.C., [1984,
Ice control	Ultrasonic measurements on deep ice cores from Antarctica. Gow, A.J., et al, [1978, p.48-50] MP 1202	26p. ₁ CR 84-13
Use of explosives in removing ice jams. Prankenstein, G.E., et al, [1970, 10p.] MP 1024	Ultrasonic investigation on ice cores from Antarctica.	Analysis of rapidly varying flow in ice-covered rivers. Per- rick, M.G., [1984, p.359-368] MP 1833
Application of ice engineering and research to Great Lakes	Kohnen, H., et al, [1979, 16p.] CR 79-10	Effect of ice cover on hydropower production. Yang, P.D.,
problems. Freitag, D.R., [1972, p.131-138]	Stratified debris in Antarctic ice cores. Gow, A.J., et al,	et al, [1984, p.231-234] NCP 1876
MP 1615	(1979, p.185-192) MP 1272	Blectromagnetic pulse propagation in dielectric alaba. Ar-
Numerical simulation of air bubbler systems. Ashton, G.D., [1977, p.765-778] MIP 936	20-yr cycle in Greenland ice core records. Hibler, W.D., III, et al, (1979, p.481-483) MF 1245	cone, S.A., [1984, p.1763-1773 ₁ MP 1991
Some economic benefits of ice booms. Perham, R.E.,	Ultrasonic investigation on ice cores from Antarctica.	Surfacing submarines through ice. Assur, A., [1984, p.309- 318] MIP 1996
[1977, p.570-591] MP 999	Kohnen, H., et al. [1979, p.4865-4874] MF 1239	Brosion of northern reservoir shores. Lawson, D.E., [1985,
Solving problems of ice-blocked drainage facilities. Carey,	Ice aheet internal reflections. Ackley, S.F., et al, [1979,	198p.; M \$5-01
K.L., [1977, 17p.] SR 77-25	p.5675-5680; MP 1319 Submerfee greenwagen of McMundo Ice Shelf Govern	Winter tire tests: 1980-81. Blaisdell, G.L., et al, 1985,
Storm drainage design considerations in cold regions. Lobacz, E.F., et al, [1978, p.474-489] MIP 1888	Subsurface measurements of McMurdo Ice Shelf. Gow, A.J., et al, [1979, p.79-80] MIP 1338	p.135-151 ₁ MP 2045
Numerical simulation of air bubbler systems. Ashton, G.D.,	Antifreeze-thermodrilling, central Ross Ice Shelf. Zotikov,	Heat transfer in water flowing over a horizontal ice sheet. Lunardini, V.J., et al, 1986, 81p.; CR 86-83
(1978, p.231-238) MP 1618	I.A., (1979, 12p.) CR 79-24	Laboratory study of flow in an ice-covered sand bed channel.
Ice and ship effects on the St. Marys River ice booms. Per-	Danish deep drill; progress report: February-March 1979.	Wuebben, J.L., [1986, p.3-14] MP 2123
ham, R.E., (1978, p.222-230) MP 1617	Rand, J.H., [1980, 37p.] SR 89-63 Time-priority studies of deep ice cores. Gow, A.J., [1980,	Ice cover strength
Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] MIP 1199	p.91-102 ₁ MP 1306	Failure of an ice bridge. DenHartog, S.L., et al, 1976,
Noncorrosive methods of ice control. Minsk, L.D., (1979,	South Pole ice core drilling, 1981-1982. Kuivinen, K.C., et	13p.) CR 76-29 Force estimate and field measurements of the St. Marys River
p.133-162 ₃ MCP 1265	al, [1982, p.89-91] MP 1621	ice booms. Perham, R.E., (1977, 26p.) CR 77-84
Suppression of river ice by thermal effluents. Ashton, G.D.,	Chemical fractionation of brine in the McMurdo Ice Shelf. Crasin, J.H., et al. r1983, 169, 1	Laboratory investigation of the mechanics and hydraulics of
[1979, 23p.] CR 79-30	Cragin, J.H., et al, [1983, 16p.] CR 83-06 Sea ice and biological activity in the Antarctic. Clarke, D.B.,	river ice jams. Tatinclaux, J.C., et al, [1977, 45p.]
Harnessing frazil ice. Perham, R.E., (1981, p.227-237, MP 1396	et al, [1984, p.2087-2095] MIP 1701	CR 77-49
Snow and ice control on railroads, highways and airports.	Baseline acidity of ancient precipitation from the South Pole.	Ice cover forces on structures. Kerr, A.D., [1978, p.123-134] NCP 879
Minsk, L.D., et al, (1981, p.671-706) MP 1447	Cragin, J.H., et al, (1984, 7p.) CR 84-15	Ice thickness-tensile stress relationship for load-bearing ice.
Ice control arrangement for winter navigation. Perham,	Sea ice properties. Tucker, W.B., III, et al, [1984, p.82-83] MP 2134	Johnson, P.R., [1980, 11p.] SR 80-09
R.E., [1981, p.1096-1103] MP 1449	Ice drilling technology. Holdsworth, G., ed, [1984, 142p.]	Evaluation of ice-covered water crossings. Dean, A.M., Jr.,
Modeling hydrologic impacts of winter navigation. Daly, S.F., et al., (1981, p.1073-1080) MP 1445	SR \$4-34	[1980, p.443-453] MP 1348
lce control at navigation locks. Hanamoto, B., [1981,	Ice drilling and coring systems—a retrospective view. Sell-	Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., [1980, 27p.] SR 88-32
p.1088-1095 ₁ MIP 1448	mann, P.V., et al, [1984, p.125-127] MP 1999	Ice force measurement on the Yukon River bridge. McPad-
Port Huron ice control model studies. Calkins, D.J., et al.	System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016	den, T., et al, [1981, p.749-777] MIP 1396
[1982, p.361-373] MP 1536 Model study of Port Huron ice control structure; wind stress	Structure of ice in the central part of the Ross Ice Shelf,	On the buckling force of floating ice plates. Kerr, A.D.,
simulation. Sodhi, D.S., et al, [1982, 27p.]	Antarctica. Zotikov, I.A., et al, 1985, p.39-441	[1981, 7p.] CR 81-49
CR 82-09	MP 2110	Plow velocity profiles in ice-covered shallow streams. Cal- kins, D.J., et al, [1982, p.236-247] MP 1540
Theory of thermal control and prevention of ice in rivers and	Consent asserted asserted as a delta sentem decision. Matter Ma	In-situ measurements of the mechanical properties of ice.
lakes. Ashton, G.D., [1982, p.131-185] MP 1554	General considerations for drill system design. Mellor, M., et al, r1976, p.77-111, MP 856	Tatinclaux, J.C., [1982, p.326-334] MP 1555
Force measurements and analysis of river ice break up. Deck, D.S., [1982, p.303-336] MP 1739	USA CRREL shallow drill. Rand, J.H., [1976, p.133-137]	Flexural strength and elastic modulus of ice. Tatinclaux,
Optimizing deicing chemical application rates. Minsk, L.D.,	MIP 673	J.C., et al., (1982, p.37-47) MP 1568
[1982, 55p.] CR 82-18	Ross Ice Shelf Project drilling, October-December 1976.	Ice properties in the Greenland and Barents Seas during sum- mer. Overgaard, S., et al, [1983, p.142-164]
Hydrsulic model study of Port Huron ice control structure.	Rand, J.H., [1977, p.150-152] MP 1061	MP 3062
Calkins, D.J., et al., [1982, 59p.] CR \$2-34	Core drilling through Ross Ice Shelf. Zotikov, I.A., et al., [1979, p.63-64] MIP 1337	Model tests on two models of WTGB 140-foot icebreaker.
How effective are icephobic coatings. Minsk, L.D., [1983, p.93-95] MP 1634	Danish deep drill; progress report: February-March 1979.	Tatinclaux, J.C., [1984, 17p.] CR 84-63
Methods of ice control. Frankenstein, G.E., et al, [1983,	Rand, J.H., [1980, 37p.] SR 60-63	Variation of ice strength within and between multiyear pres- sure ridges in the Beaufort Sea. Weeks, W.F., [1984,
p.204-215; MP 1642	South Pole ice core drilling, 1981-1982. Kuivinen, K.C., et	p.134-139 ₁ MCP 1680
Ice sheet retention structures. Perham, R.B., [1983, 33p.]	al, [1982, p.89-91] MP 1621 Ice drilling technology. Holdsworth, G., ed, [1984, 142p.]	Deterioration of floating ice covers. Ashton, G.D., [1984,
CR 83-30	SR \$4-34	p.26-33 ₁ MP 1676
Navigation ice booms on the St. Marys River. Perham, R.E., [1984, 12p.] CR 84-64	Ice-coring augers for shallow depth sampling. Rand, J.H., et	Model tests in ice of a Canadisn Cosst Guard R-class ice- breaker. Tatinclaux, J.C., [1984, 24p.] SR 84-86
Performance of the Allegheny River ice control structure,	al, [1985, 22p.] CR 85-21	Ice deterioration. Ashton, G.D., [1984, p.31-38]
1983. Deck, D.S., et al, [1984, 15p.] SR 84-13	Toulous market analysis in the Markets is Birms assisted Markets	MIP 1791
Ice sheet retention structures. Perham, R.E., [1984, p.339-	Environmental analyses in the Kootenai River region, Montana. McKim, H.L., et al, [1976, 53p.] SR 76-13	Workshop on Ice Penetration Technology, Hanover, NH,
348 ₃ MP 1832 Methods of ice control for winter navigation in inland waters.	Water resources by satellite. McKim, H.L., [1978, p.164-	June 12-13, 1984. [1984, 345p.] SR 84-33
Frankenstein, G.E., et al. [1984, p.329-337] MP 1831	169 ₂ MP 1090	Penetration of shaped charges into ice. Mellor, M., [1984, p.137-148] MP 1995
Controlling river ice to alleviate ice jam flooding. Deck,	Towing ships through ice-clogged channels by warping and	Shopper's guide to ice penetration. Mellor, M., [1984, p.1-
D.S., (1984, p.69-76) MP 1885	kedging. Mellor, M., [1979, 21p.] CR 79-21 Winter surveys of the upper Susitna River, Alaska. Bilello,	35 ₁ MP 1992
Cold facts of ice jams: case studies of mitigation methods. Calkins, D.J., [1984, p.39-47] MP 1793	M.A., [1980, 30p.] SR 90-19	Mechanics of ice cover breakthrough. Kerr, A.D., 1984,
Controlling river ice to alleviate ice jam flooding. Deck,	Electromagnetic subsurface measurements. Dean, A.M., Jr.,	p.245-262 ₁ MP 1997 Deterioration of floating ice covers. Ashton, G.D., [1985,
D.S., [1984, p.524-528] MP 1795	[1981, 19p.] SR \$1-23	p.177-182 ₁ MP 2122
Polyethylene glycol as an ice control coating. Itagaki, K.,	Explosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, p.347-354]	Ice penetration tests. Garcia, N.B., et al, [1985, p.223-
[1984, 11p.] CR 84-28	MP 1872	236 ₁ MIP 2014
Survey of ice problem areas in navigable waterways. Zufelt, J., et al, (1985, 32p., SR 85-62	Structure to form an ice cover on river rapids in winter. Per-	In-ice calibration tests for an elongate, uniaxial brass ice stress
foe jam flood prevention measures, Lamoille River, Hardwick	ham, R.B., [1986, p.439-450] MP 2128	sensor. Johnson, J.B., [1985, p.506-510] MP 1966 Ice cover research—present state and future needs. Kerr.
VT. Calkins, D.J., (1985, p.149-168) MIP 1940	Ice cover effect	A.D., et al, [1986, p.384-399] MP 2004
Cazenovia Creek Model data acquisition system. Bennett,	Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, [1976, p.53-76] MP 1378	Crushing of ice sheet against rigid cylindrical structures.
B.M., et al. [1985, p.1424-1429] MP 2090	Suppression of ice fog from cooling ponds. McFadden, T.,	Sodhi, D.S., et al, (1986, p.1-12) MIP 2018
Upper Delaware River ice control—a case study. Zufelt, J.E., et al., [1986, p.760-770] MP 2005	[1976, 78p.] CR 76-43	Ice cover thickness
Snow and ice prevention in the United States. Minsk, L.D.,	Ice and navigation related sedimentation. Wuebben, J.L., et al., r1978, p.393-403; MP 1133	Salinity variations in sea ice. Cox, G.F.N., et al, [1974, p.109-122] MP 1023
(1986, p.37-42) MP 1874	al, [1978, p.393-403] MP 1133 Turbulent heat transfer from a river to its ice cover. Haynes,	Remote sensing program required for the AIDJEX model.
Ice cores	F.D., et al, [1979. 5p.] CR 79-13	Weeks, W.F., et al. (1974, p.22-44) MP 1040
Greenland climate changes shown by ice core. Danagaard, W., et al, [1971, p.17-22] MP 998	Analysis of velocity profiles under ice in shallow streams.	Stability of Antarctic ice. Weertman, J., [1975, p.159]
Oxygen isotope profiles through ice sheets. Johnson, S.J., et	Calkins, D.J., et al. [1981, p.94-111] MIP 1397	MP 1042
al, (1972, p.429-434) MCP 997	Effects of ice on coal movement via the inland waterways. Lunardini, V.J., et al, [1981, 72p.] SR 81-13	Remote sensing plan for the AIDJEX main experiment. Weeks, W.F., et al, (1975, p.21-48) MP 862
Byrd Land quaternary volcanism. LeMasurier, W.B.,	Application of HBC-2 for ice-covered waterways. Calkins,	Thickness and roughness variations of arctic multiyear sea ice.
(1972, p.139-141) MP 994	D.J., et al, [1982, p.241-248] MP 1575	Ackley, S.P., et al, [1976, 25p.] CR 76-18
Polar ice-core storage facility. Langway, C.C., Jr., 1976, p.71-75; MP 874	Reservoir bank erosion caused and influenced by ice cover.	Sea ice properties and geometry. Weeks, W.F., (1976, p.137-171)
Vanadium and other elements in Greenland ice cores. Her-	Gatto, L.W., [1982, 26p.] SR 82-31 Using the DWOPER routing model to simulate river flows	p.137-171 ₁ MIP 918 Radar imagery of ice covered North Slope lakes. Weeks,
ron, M.M., et al, [1976, 4p.] CR 76-24	with ice. Daly, S.F., et al., [1983, 19p.] SR 83-01	W.F., et al, [1977, p.129-136] MIP 923
Aerosols in Greenland snow and ice. Kumai, M., [1977,	Unsteady river flow beneath an ice cover. Perrick, M.G., et	Ses ice thickness profiling and under-ice oil entrapment.
p.341-350 ₁ MP 1725	al, (1983, p.254-260) MIP 2679	Kovacs, A., (1977, p.54 550) MP 940
Vanadium and other elements in Greenland ice cores. Herron, M.M., et al., [1977, p.98-102] MP 1092	Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al, [1983, 103p.] SR 83-30	Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] MP 934

Ice decay patterns on a lake, a river and coestal bay in Canada. Bilello, M.A., (1977, p.120-127) MP 969	Shopper's guide to ice penetration. Mellor, M., [1984, p.1-35] MP 1992	Ice crystal fermatics. Compressed air seeding of supercooled fog. Hicks, J.R.,
Decay patterns of land-fast see ice in Canada and Alaska.	Determining the characteristic length of floating ice sheets by	[1976, 9p.] SR 76-09
Bilello, M.A., (1977, p.1-10) MP 1161	moving loads. Sodhi, D.S., et al, (1985, p. 155-159)	Use of compressed air for supercooled fog dispersal. Wein- stein, A.I., et al., (1976, p.1226-1231) MP 1614
See ice studies in the Weddell See region aboard USCGC Burton Island. Ackley, S.F., [1977, p.172-173]	Unified degree-day method for river ice cover thickness simu-	stein, A.I., et al. (1976, p.1226-1231) MP 1614 Ion crystal growth
MP 1014	lation. Shen, H.T., et al, [1985, p.54-62] MP 2065	Crystal alignments in the fast ice of Arctic Alaska. Weeks,
Iceberg thickness profiling using an impulse radar. Kovaca, A., [1977, p.140-142] MP 1012	Numerical modeling of sea ice dynamics and ice thickness. Hibler, W.D., III, [1985, 50p.] CR 85-85	W.F., et al, [1979, 21p.] CR 79-22
Delineation and engineering characteristics of permafrost	Measuring multi-year ses ice thickness using impulse radar.	Introduction to the basic thermodynamics of cold capillary systems. Colbeck, S.C., [1981, 9p.] SR 81-86
benesth the Besufort Ses. Sollmann, P.V., et al, 1977, p.432-440; MP 1677	Kovacs, A., et al, [1985, p.55-67] MP 1916	Configuration of ice in frozen media. Colbeck, S.C., [1982,
Subsurface measurements of the Ross Ice Shelf, McMurdo	Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, 1985, p.46-541 MIP 1915	p.116-123 ₁ MP 1512 lee crystal morphology and growth rates at low supersatura-
Sound, Antarctica. Kovaca, A., et al. [1977, p.146-148] MP 1013	Numerical simulation of Northern Hemisphere sea ice varia-	tions and high temperatures. Colbeck, S.C., 1983,
loeberg thickness and crack detection. Kovacs, A., [1978,	bility, 1951-1980. Walsh, J.E., et al, 1985, p.4847-4865; MP 1882	p.2677-2682 ₁ MP 1537 Theory of metamorphism of dry snow. Colbeck, S.C.,
p.13I-145; MIP 1128	4865 ₁ MP 1882 Blectromagnetic properties of multi-year sea ice. Morey,	[1983, p.5475-5482] MP 1663
Iceberg thickness profiling. Kovacs, A., (1978, p.766-774) MP 1619	R.M., et al, [1985, p.151-167] MP 1962	Prazil ice. Daly, S.F., [1983, p.218-223] MP 2078
Radar profile of a multi-year pressure ridge fragment.	Role of plastic ice interaction in marginal ice zone dynamics. Lepparanta, M., et al. (1985, p.11,899-11,909)	Frazil ice dynamics. Daly, S.F., [1984, 46p.] M 84-01
Kovaca, A., (1978, p.59-62) MP 1126 Physical measurement of ice jams 1976-77 field season.	MP 1544	Comments on "Theory of metamorphism of dry snow" by S.C. Colbeck. Sommerfeld, R.A., [1984, p.4963-4965]
Wuebben, J.L., et al, (1978, 19p.1 SR 78-03	Ice cracks	MP 1900
Profiles of pressure ridges and ice islands in the Beaufort Sea.	Investigation of ice forces on vertical structures. Hirayama, K., et al, [1974, 153p.] MP 1041	Dynamics of frazil ice formation. Daly, S.F., et al., 1984, p.161-172; MP 1829
Hnatink, J., et al. (1978, p.519-532) MP 1187 Dynamics of pear-shore ice. Koyaca, A., et al. (1978, p.11-	Misgivings on isostatic imbalance as a mechanism for see ice	Ice crystal growth in subcooled NaCl colutions. Sullivan,
Dynamics of near-shore ice. Kovacs, A., et al., 1978, p.11- 22 ₁ MP 1295	cracking. Ackley, S.F., et al, (1976, p.85-94)	J.M., Jr., et al, [1985, p.527-532] MP 2100 Temperature dependence of the equilibrium form of ice.
Remote detection of water under ice-covered lakes on the North Slope of Alasks. Kovacs, A., [1978, p.448-458]	Iceberg thickness and crack detection. Kovacs, A., [1978,	Colbeck, S.C., (1985, p.726-732) MIP 1939
MP 1214	p.131-145 ₁ MIP 1128	Ice crystal sucisi
Characteristics of ice on two Vermont rivers. Deck, D.S., (1978, 30p.)	Fracture behavior of ice in Charpy impact testing. Itagaki, K., et al, [1980, 13p.] CR 88-13	Apparent anomaly in freezing of ordinary water. Swinzow, G.K., [1976, 23p.] CR 76-20
(1978, 30p.) SR 78-30 Laboratory experiments on icing of rotating blades. Ackley,	Mechanical properties of polycrystalline ice. Mellor, M.,	Ice crystal formation and supercooled fog dissipation.
S.F., et al, [1979, p.85-92] MIP 1236	(1980, p.217-245) MTP 1302	Kumai, M., (1982, p.579-587) MP 1539
Accelerated ice growth in rivers. Calkina, D.J., [1979, 5p.] CR 79-14	Bending and buckling of a wedge on an elastic foundation. Nevel, D.B., (1980, p.278-288) MP 1303	Frazii ice dynamica. Duly, S.F., [1984, 46p.] Mi 84-01 Ice crystal eptics
Dynamic thermodynamic sea ice model. Hibler, W.D., III,	Acoustic emission and deformation response of finite ice	Near-infrared reflectance of anow-covered substrates. O'-
[1979, p.815-846] MP 1247	plates. Xirouchakis, P.C., et al, [1981, p.123-133] MP 1436	Brien, H.W., et al. [1981, 17p.] CR 81-21
Break-up of the Yukon River at the Haul Road Bridge: 1979. Stephens, C.A., et al, [1979, 22p. + Figs.] MIP 1315	Acoustic emission and deformation response of finite ice	Ice crystal structure Growth and mechanical properties of river and lake ice.
Dynamics of near-shore ice. Kovacs, A., et al. [1979,	plates. Xirouchakis, P.C., et al, [1981, p.385-394]	Ramecier, R.O., [1972, 243p.] MIP 1883
p.181-207; MP 1291 Point source bubbler systems to suppress ice. Ashton, G.D.,	MP 1455 Study on the tensile strength of ice as a function of grain size.	Crystal fabrics of West Antarctic ice sheet. Gow, A.J., et al., [1976, p.1665-1677] MP 1382
[1979, p.93-100] MP 1326	Currier, J.H., et al, [1983, 38p.] CR 83-14	Flexural strength of ice on temperate lakes. Gow, A.J.,
Restriction of ice deflectors on the USCG icebreaker Polar Star. Vance, G.P., (1980, 37p.; SR 80-04	Experimental determination of buckling loads of cracked ice	[1977, p.247-256] MP 1063
Star. Vance, G.P., (1980, 37p.; SR 80-64 Icebreaking concepts. Mellor, M., (1980, 18p.)	sheets. Sodhi, D.S., et al, [1984, p.183-186] MP 1687	Abnormal internal friction peaks in single-crystal ice. Stall-man, P.E., et al, [1977, 15p.] SER 77-23
SR 90-02	Influence of grain size on the ductility of ice. Cole, D.M.,	Radar anisotropy of sea ice. Kovaca, A., et al, [1978, p.171-
Performance of the USCGC Katmai Bay icebreaker. Vance, G.P., [1980, 28p.] CR 98-08	[1984, p.150-157] MP 1686 Dependence of crushing specific energy on the aspect ratio	201 ₁ MP 1111
Maximum thickness and subsequent decay of lake, river and	and the structure velocity. Sodhi, D.S., et al, [1984,	Preferred crystal orientations in Arctic Ocean fast ice. Weeks, W.F., et al, (1978, 24p.) CR 78-13
fast sea ice in Canada and Alaska. Bilello, M.A., 1980, 160p.; CR 89-66	p.363-3741 MP 1708	Ultrasonic measurements on deep ice cores from Antarctica.
See ice growth, drift, and decay. Hibler, W.D., III, [1980,	Grain growth and the creep behavior of ice. Cole, D.M., [1985, p.187-189] MP 1862	Gow, A.J., et al, [1978, p.48-50] MP 1262 X-ray measurement of charge density in ice. Itagaki, K.,
p.141-209 ₁ MIP 1298	Fracture toughness of model ice. Dempsey, J.P., et al,	[1978, 12p.] CR 79-25
Evaluation of ice-covered water crossings. Dean, A.M., Jr., [1980, p.443-453] MP 1348	[1986, p.365-376] MP 2125	Radar anisotropy of sea ice. Kovaca, A., et al. (1978, p.6037-6046) MP 1139
Ice characteristics in Whitefish Bay and St. Marys River in	Creep theory for a floating ice sheet. Nevel, D.B., [1976,	p.6037-6046) MP 1139 Ultrasonic investigation on ice cores from Antarctics.
winter. Vance, G.P., [1980, 27p.] SR 88-32 Modeling a variable thickness sea ice cover. Hibler, W.D.,	98p. ₃ SR 7 6-84	Kohnen, H., et al, [1979, 16p.] CR 79-10
III, [1980, p.1943-1973] MIP 1424	Geodetic positions of borehole sites in Greenland. Mock, S.J., (1976, 7p.) CR 76-41	Ultrasonic investigation on ice cores from Antarctica. Kohnen, H., et al, [1979, p.4865-4874] MIP 1239
Method for measuring brash ice thickness with impulse radar. Martinson, C.R., et al, (1981, 10p.) SR 81-11	Rheology of ice. Fish, A.M., (1978, 196p.) MP 1968	Anisotropic properties of sea ice. Kovaca, A., et al., [1979,
Morphology of see loe pressure ridge sails. Tucker, W.B., et	Creep rupture at depth in a cold ice sheet. Colbeck, S.C., et	p.5749-5759 MP 1258 Crystal alignments in the fast ice of Arctic Alaska. Weeks,
al, [1981, p.1-12] MP 1465	al, (1978, p.733) MP 1168 Polycrystalline ice mechanics. Hooke, R.L., et al, (1979,	Crystal alignments in the fast ice of Arctic Alaska. Weeks, W.F., et al, [1979, 21p.] CR 79-22
Pooling of oil under sea ice. Kovaca, A., et al, [1981, p.912- 922] MP 1459	16p.j MIP 1207	Anisotropic properties of sea ice in the 50-150 MHz range.
Ice-covered North Slope lakes observed by radar. Weeks,	Some promising trends in ice mechanics. Assur, A., [1980, : p.1-15] MP 1366	Kovaca, A., et al., (1979, p.324-353) MP 1620 Crystal alignments in the fast ice of Arctic Alaska. Weeks,
W.F., et al, [1981, 17p.] CR 81-19 Modeling pressure ridge buildup on the geophysical scale.	Mechanical properties of polycrystalline ice. Mellor, M.,	W.P., et al, [1980, p.1137-1146] MP 1277
Hibler, W.D., III, [1982, p.141-155] MP 1590	[1980, p.217-245] MP 1302	Sea ice anisotropy, electromagnetic properties and strength. Kovacs, A., et al, [1980, 18p.] CR 86-20
Breakup of solid ice covers due to rapid water level variations. Billfalk, L., [1982, 17p.] CR 82-03	Mechanical properties of polycrystalline ice. Hooke, R.L., et al, [1980, p.263-275] MP 1328	Acoustic emission and deformation response of finite ice
Performance of a point source bubbler under thick ice.	Cyclic loading and fatigue in ice. Mellor, M., et al, [1981,	plates. Xirouchakia, P.C., et al, [1981, p.385-394] MP 1455
Haynes, F.D., et al, [1982, p.111-124] MP 1529	p.41-53 ₁ MP 1371	Growth, structure, and properties of sea ice. Weeks, W.F.,
Effects of conductivity on high-resolution impulse radar sounding. Morey, R.M., et al, (1982, 12p.)	Glacier mechanics. Mellor, M., [1982, p.455-474] MP 1532	et al, (1982, 130p.) M 82-01
CR \$2-42	Polycrystalline ice creep in relation to applied stresses. Cole,	Configuration of ice in frozen media. Colbeck, S.C., (1982, p.116-123) MP 1512
Numerical simulation of the Weddell Sea peck ice. Hibler, W.D., III, et al. (1983, p.2873-2887) MP 1892	D.M., (1983, p.614-621) MP 1582 Stress/strain/time relations for ice under uniaxial compres-	Acoustic emissions from polycrystalline ice. St. Lawrence,
Properties of urea-doped ice in the CRREL test besin.	sion. Mellor, M., et al. (1983, p.207-230) MP 1587	W.F., et al. (1982, p.183-199) MP 1524
Hirayama, K., [1983, 44p.] CR 83-08 Ice properties in the Greenland and Barents Seas during sum-	Stress measurements in ice. Cox, G.F.N., et al. (1983, 310.)	Acoustic emissions from polycrystalline ice. St. Lawrence, W.F., et al, [1982, 15p.] CR 82-21
mer. Overgaard, S., et al, (1983, p.142-164)	31p. ₁ CR 83-23 Relationship between creep and strength behavior of ice at	Polycrystalline ice creep in relation to applied stresses. Cole,
MP 2062 Lake ice decay. Ashton, G.D., [1983, p.83-86]	failure. Cole, D.M., [1983, p.189-197] MP 1681	D.M., (1983, p.614-621) MP 1882 Ice crystal morphology and growth rates at low supersatura-
MP 1684	Effect of stress application rate on the creep behavior of poly- crystalline ice. Cole, D.M., [1983, p.454-459]	tions and high temperatures. Colbeck, S.C., [1983,
Changes in the Ross Ice Shelf dynamic condition. Jezek,	MP 1671	p.2677-2682; MP 1537 Study on the tensile strength of ice as a function of grain size.
K.C., [1984, p.409-416] MP 2088 Dependence of crushing specific energy on the aspect ratio	Influence of grain size on the ductility of ice. Cole, D.M.,	Currier, J.H., et al, [1983, 38p.] CR 83-14
and the structure velocity. Sodhi, D.S., et al, [1984,	[1984, p.150-157] MP 1686 Grain growth and the creep behavior of ice. Cole, D.M.,	Properties of sea ice in the coastal zones of the polar oceans.
p.363-374 ₁ MP 1798 On the role of ice interaction in marginal ice zone dynamics.	[1985, p.187-189] MP 1862	Weeks, W.F., et al, (1983, p.25-41) MP 1664 Snow characterization at SNOW-ONE-B. Berger, R.H., et
Leppitranta, M., et al., [1984, p.23-29] MP 1781	Ice creatings	al, [1983, p.155-195] MP 1847
Ice jems in shallow rivers with floodplain flow: Discussion. Beltace, S., £1984, p.370-371; MP 1796	Height variation along sea ice pressure ridges. Hibler, W.D., III, et al., (1975, p.191-199) MP 348	Utilization of the snow field test series results for development of a snow obscuration primer. Ebersole, J.F., et al, [1983,
Structure of first-year pressure ridge sails in the Prudhoe Bay	Ice thickness-tensile stress relationship for load-bearing ice.	p.209-217 ₁ MP 1692
region. Tucker, W.B., et al, (1984, p.115-135) MP 1837	Johnson, P.R., [1980, 11p.] SR 50-09 Evaluation of ice-covered water crossings. Dean, A.M., Jr.,	Compressive strength of frozen silt. Zhu, Y., et al, [1984, p.3-15] MP 1773
Computer simulation of ice cover formation in the Upper St.	[1980, p.443-453] MP 1348	p.3-15 ₁ MP 1773 Crystalline structure of ures ice sheets used in modeling in the
Lawrence River. Shen, H.T., et al, [1984, p.227-245]	Snow in the construction of ice bridges. Coutermersh, B.A.,	CRREL test basin. Gow, A.J., (1984, p.241-253)
MP 1814	et al, [1985, 12p.] SR 85-18	MP 1835

Les crystal structure (cost.)	Dynamics of near-shore ice. Kovscs, A., et al, [1977, p.151-163] MP 1873	Calculating borehole geometry. Jezek, K.C., et al. [1984, 18p.]
Quiet freezing of lakes and the concept of orientation textures in lake ice sheets. Gow, A.J., (1984, p.137-149) MP 1828	Modeling pack ice as a viscous-plastic continuum. Hibler,	Shopper's guide to ice penetration. Mellor, M., (1984, p.1-35) MP 1992
Mechanical properties of sea ice: a status report. Weeks,	Arching of model ice flore at bridge piers. Calkins, D.J.,	Ice drilling and coring systems—a retrospective view. Sell-
W.F., et al, [1984, p.135-198] MP 1906 Crystalline structure of urea ice sheets. Gow, A.J., [1984,	(1978, p.495-507) MP 1134 Measurement of mesoscale deformation of Beaufort sea ice	You edge
48p.; CE 84-24 Structure and the compressive strength of ice from pressure	(AIDJEX-1971). Hibier, W.D., III, et al, (1978, p.148- 172 ₁ MP 1179	Margin of the Greenland ice sheet at Isua. Colbeck, S.C., et al, [1979, p.155-165] MP 1281
ridges. Richter, J.A., et al, [1985, p.99-102] MP 1849	Polycrystalline ice mechanics. Hooke, R.L., et al, 1979, 16p. ₁ MP 1287	Physical oceanography of the seasonal sea ice zone. McPhes, M.G., (1980, p.93-132) MP 1294
Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1910	Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al, [1979, 24p.] CR 79-66	Chosnofiagellata from the Weddell Sea, summer 1977. Buck, K.R., [1980, 26p.] CR 86-16
Temperature dependence of the equilibrium form of ice. Colbeck, S.C., [1985, p.726-732] MP 1939	See ice ridging over the Alaskan continental shelf. Tucker, W.B., et al, [1979, p.4885-4897] MIP 1240	Air-ice-ocean interaction in Arctic marginal ice zones. Wadhams, P., ed, (1981, 20p.) SR 81-19
Orientation textures in ice sheets of quietly frozen lakes. Gow, A.J., [1986, p.247-258] MP 2118	Mass-balance aspects of Weddell Sea pack-ice. Ackley, S.F., (1979, p.391-405) MP 1286	Atmospheric dynamics in the antarctic marginal ice zone. Andress, B.L., et al, [1984, p.649-661] MP 1667
Laboratory and field studies of ice friction coefficient. Tatia- claux, J.C., et al, [1986, p.389-400] MP 2126	Bending and buckling of a wedge on an elastic foundation. Nevel, D.E., 1980, p.278-289 MP 1303	Marginal ice zones: a description of air-ice-ocean interactive processes, models and planned experiments. Johannessen,
Compressive deformation of columnar see ice. Brown, R.L.,	Mechanical properties of polycrystalline ice. Hooke, R.L., et	O.M., et al., (1984, p.133-146) MP 1673
Ice crystals	Investigation of the acoustic emission and deformation re-	Drag coefficient across the Antarctic marginal ice zone. Andreas, R.L., et al. [1984, p.63-71] MP 1784
Producing strain-free flat surfaces on single crystals of ice: comments. Tobin, T.M., [1973, p.519-520]	sponse of finite ice plates. Xirouchakia, P.C., et al, [1981, 19p.] CR 81-66	Mechanism for floe clustering in the marginal ice zone. Lep- paranta, M., et al, [1984, p.73-76] MP 1785
MP 1000 Measuring the uniaxial compressive strength of ice. Haynes,	Acoustic emission and deformation of ice plates. Xirouchakis, P.C., et al. [1982, p.129-139] MP 1589	Modeling the marginal ice zone. Hibler, W.D., III, ed, [1984, 99p.] SR 84-87
F.D., et al, [1977, p.213-223] MIP 1027 Effect of temperature and strain rate on the strength of poly-	lce behavior under constant stress and strain. Mellor, M., et al, [1982, p.201-219] MP 1525	Analysis of linear sea ice models with an ice margin. Lep- parants, M., (1984, p.31-36) MIP 1782
crystalline ice. Haynes, P.D., [1977, p.107-111] MP 1127	Deformation and failure of frozen soils and ice due to stresses. Fish, A.M., [1982, p.419-428] MP 1553	On the role of ice interaction in marginal ice zone dynamics. Leppitranta, M., et al., [1984, p.23-29] MP 1781
Dielectric properties of dislocation-free ice. Itagaki, K., [1978, p.207-217] MIP 1171	Determining the characteristic length of floating ice sheets by moving loads. Sodhi, D.S., et al, [1985, p.155-159]	Some simple concepts on wind forcing over the marginal ice zone. Tucker, W.B., 1984, p.43-48; MP 1783
Polycrystalline ice mechanics. Hooke, R.L., et al., 1979, 16p.; MP 1267	MI 1855 Compressive deformation of columnar sea ice. Brown, R.L.,	Ocean circulation: its effect on seasonal sea-ice simulations. Hibler, W.D., III, et al, [1984, p.489-492] MP 1700
Dynamics of near-shore ice. Kovacs, A., et al., [1979, p.181-207]	et al, (1986, p.241-252) MP 2124	Air-ice-ocean interaction experiments in Arctic marginal ice
Preparation of polycrystalline ice specimens for laboratory	Investigation of ice islands in Babbage Bight. Kovacs, A., et	zones. [1984, 56p.] SR 84-28 Mesoscale air-ice-ocean interaction experiments. Johan-
experiments. Cole, D.M., (1979, p.153-159) MP 1327	al, (1971, 46 leaves) MP 1381 Misgivings on isostatic imbalance as a mechanism for sea ice	nessen, O.M., ed, [1984, 176p.] SR 84-29 Heat and moisture advection over antarctic sea ice. An-
Mechanical properties of polycrystalline ice. Mellor, M., 1980, p.217-245; MP 1302	crecking. Ackley, S.F., et al, [1976, p.85-94] MP 1379	dress, B.L., [1985, p.736-746] MP 1888 Role of plastic ice interaction in marginal ice zone dynamics.
Mechanical properties of polycrystalline ice. Hooke, R.L., et al, [1980, p.263-275] MP 1328	Sintering and compaction of anow containing liquid water. Colbeck, S.C., et al, [1979, p.13-32] MP 1190	Leppiiranta, M., et al, [1985, p.11,899-11,909] MP 1544
Cyclic loading and fatigue in ice. Mellor, M., et al, [1981, p.41-53] MP 1371	loe characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., [1980, 27p.] SR 86-32	Ice elasticity Concentrated loads on a floating ice sheet. Nevel, D.E.,
Charged dialocation in ice. 2. Contribution of dielectric relaxation. Itagaki, K., [1982, 15p.] CR 82-07	Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] CR 81-10	(1977, p.237-245) MP 1062 Mechanical properties of polycrystalline ice. Mellor, M.,
Attenuation and backscatter for snow and sleet at 96, 140, and 225 GHz. Nemarich, J., et al, (1984, p.41-52)	Equations for determining the gas and brine volumes in sea ice samples. Cox, G.F.N., et al, [1982, 11p.]	(1980, p.217-245) MP 1302
MP 1864 Structure of ice in the central part of the Ross Ice Shelf,	CR 82-30	Acoustic emission and deformation response of finite ice plates. Kirouchakis, P.C., et al., (1981, p.123-133)
Antarctica. Zotikov, I.A., et al, [1985, p.39-44] MP 2110	Equations for determining gas and brine volumes in sea ice. Cox, O.F.N., et al., 1983, p.306-316, MP 2855	MP 1436 Messuring mechanical properties of ice. Schwarz, I., et al.
Ice cutting	Structure, selluity and density of multi-year sea ice pressure ridges. Richter-Menge, J.A., et al, [1985, p.194-198, MP 1887	(1981, p.245-254) MP 1556 In-situ measurements of the mechanical properties of ice.
Cutting ice with high pressure water jets. Mellor, M., et al. (1973, 22p.) MP 1061	Mechanical properties of multi-year pressure ridge samples.	Tatinclaux, J.C., (1982, p.326-334) MP 1555 Flexural strength and elastic modulus of ice. Tatinclaux,
Development of large ice saws. Garfield, D.E., et al., 1976, 14p.; CR 76-47	Richter-Menge, J.A., [1985, p.244-251] MP 1936 Structure, selinity and density of multi-year sea ice pressure	I.C., et al, [1982, p.37-47] MP 1568 Determining the characteristic length of model ice sheets.
Dynamics and energetics of parallel motion tools for cutting and boring. Mellor, M., (1977, 85p.) CR 77-67	ridges. Richter-Menge, J.A., et al, [1985, p.493-497] MP 1965	Sodhi, D.S., et al, [1982, p.99-104] MP 1576 Mechanical behavior of sea ice. Mellor, M., [1983, 105p.]
Transverse rotation machines for cutting and boring in perma- frost. Mellor, M., (1977, 36p.) CE 77-19	Ice properties in a grounded man-made ice island. Cox, G.F.N., et al, (1986, p.135-142) MIP 2632	M 83-1 Stress measurements in ice. Cox, G.F.N., et al, (1983,
Design for cutting machines in permafrost. Mellor, M., [1978, 24p.]	Ice detection Remote sensing of massive ice in permafrost along pipelines	31p. ₃ CR 83-23
Icebreaking concepts. Mellor, M., [1980, 18p.]	in Alaska. Kovsos, A., et al, [1979, p.268-279] MIP 1175	Ice electrical properties Engineering properties of sea ice. Schwarz, J., et al., (1977,
Mechanics of cutting and boring in permafrost. Mellor, M.,	Method of detecting voids in rubbled ice. Tucker, W.B., et al, (1984, p.183-188)	p.499-53[] MP 1065 Dielectric constant and reflection coefficient of snow surface
Ice dams	Impulse rader sounding of frozen ground. Kovaca, A., et al,	Inyers in the McMurdo Ice Shelf. Kovaca, A., et al., [1977, p.137-138] MP 1011
Field investigations of a hanging ice dam. Beltaos, S., et al, [1982, p.475-488] MP 1533	Comparison of winter climatic data for three New Hampshire	Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-86
Field investigation of St. Lawrence River hanging ice dama. Shen, H.T., et al, (1984, p.241-249) MIP 1830	Ice deterioration	Internal properties of the ice sheet at Cape Folger by radio echo sounding. Keliher, T.E., et al, [1978, 12p.]
Structure to form an ice cover on river rapids in winter. Per- ham, R.E., [1986, p.439-450] MIP 2128	Ice decay patterns on a lake, a river and coastal bay in Canada. Bilello, M.A., (1977, p.120-127) MP 969	CR 78-04 Dielectric properties of dislocation-free ice. Itagaki, K.,
Ice deting C-14 and other isotope studies on natural ice. Oescheer, H.,	Decay patterns of land-fast sea ice in Canada and Alaska. Bilelio, M.A., (1977, p.1-10) MP 1161	(1978, p.207-217) MP 1171 X-ray measurement of charge density in ice. Itagaki, K.,
et al. (1972, p.D70-D92; MP 1052 Dating annual layers of Greenland ice. Langway, C.C., Jr.,	Break-up dates for the Yukon River; Pt. 1. Rampert to White- borse, 1896-1978. Stephens, C.A., et al, [1979, c50]	(1978, 12p.) CR 79-25 Break-up of the Yukon River at the Haul Road Bridge: 1979.
et al, [1977, p.302-306] MIP 1094	leaves MP 1317 Maximum thickness and subsequent decay of lake, river and	Stephens, C.A., et al, [1979, 22p. + Figs.] MP 1315
Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al., 1977, 223, 225, 225	fast ses ice in Canada and Alaska. Bilello, M.A., (1980, 160p.)	Oil pooling under sea ice. Kovacs, A., t1979, p.310-323, MP 1289
p.322-3251 MP 1095 Ics deformation	Ice growth on Post Pond, 1973-1982. Gow, A.J., et al. [1983, 25p.] CR 83-04	Anisotropic properties of sea ice in the 50-150 MHz range. Kovaca, A., et al, [1979, p.324-353] MP 1620
Small-scale strain measurements on a glacier surface. Colbeck, S.C., et al, (1971, p.237-243) MP 993	Predicting lake ice decay. Ashton, G.D., [1983, 4p.]	Distortion of model subsurface radar pulses in complex die- lectrics. Arcone, S.A., [1981, p.855-864] MP 1472
Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971). Hibler, W.D., III, et al. (1974,	Pirst-generation model of ice deterioration. Ashton, G.D.,	Growth, structure, and properties of sea ice. Weeks, W.F., et al, [1982, 130p.] M 82-81
p.119-138; MP 1035 Statistical variations in Arctic sea ice ridging and deformation	[1983, p.273-278] MP 2000 Deterioration of floating ice covers. Ashton, G.D., [1984,	Charged dialocation in ice. 2. Contribution of dielectric relaxation. Itagaki, K., [1982, 15p.] CR 82-07
rates. Hibler, W.D., III, (1975, p.J1-J16; MP 856 Remote measurement of sea ice drift. Hibler, W.D., III, et	p.26-33 ₁ MP 1676 loe deterioration. Ashton, G.D., [1984, p.31-38 ₁]	Effect of X-ray irradiation on internal friction and dielectric relaxation of ice. Itagaki, K., et al, (1983, p.4314-4317)
al, (1975, p.541-554) MIP 849 See ice drift and deformation from LANDSAT imagery. Hi-	MP 1791 Deterioration of floating ice covers. Ashton, G.D., r1985,	MP 1470 Possibility of anomalous relaxation due to the charged dislo-
bler, W.D., III, et al. (1976, p.113-135) MP 1659 Techniques for studying sea icc drift and deformation at sites	p.177-182 _j MP 2122 Too drills	cation process. Itagaki, K., [1983, p.4261-4264] MP 1669
far from land using LANDSAT imagery. Hibler, W.D., III, et al., (1976, p.395-609) MP 866	Melting and freezing of a drill hole through the Antarctic shelf ion. Then, C., et al, [1975, p.421-432] MP 861	Electromagnetic properties of sea ice. Morey, R.M., et al, {1984, 32p.} CR 84-62
Crystal fabrics of West Anterctic ice sheet. Gow, A.J., et al., [1976, p.1665-1677] MP 1382	1979 Greenland Ice Sheet Program. Phase 1: casing operation. Rand, J.H., [1980, 18p.] SR 88-24	Electromagnetic properties of sea ice. Morey, R.M., et al, (1984, p.53-75) MP 1776
, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		The state of the s

Coaxial waveguide reflectometry for frozen ground and ice.	Apparent anomaly in freezing of ordinary water. Swinzow,	Sheet ice forces on a conical structure: an experimental study.
Delaney, A.J., et al, (1984, p.428-431) MP 2048 Discussion: Electromagnetic properties of sea los by R.M.	G.K., (1976, 23p.) CR 76-20 los accumulation on ocean structures. Minak, L.D., (1977,	Sodhi, D.S., et al. (1985, p.46-54) MP 1915 Field tests of the kinetic friction coefficient of sea ice. Tatin-
Morey, A. Kovace and G.F.N. Cox. Arcone, S.A., [1984, p.93-94] MP 1821	42p. ₁ CR 77-17 Segregation freezing as the cause of suction force for ice less	claux, J.C., et al, [1985, 20p.] CR 85-17 Level ice breaking by a simple wedge. Tatinclaux, J.C.,
Authors' response to discussion on: Electromagnetic proper- ties of sea ice. Morey, R.M., et al, (1984, p.95-97)	formation. Takagi, S., [1978, 13p.] CR 78-66 Pundamentals of ice loss formation. Takagi, S., [1978,	[1985, 46p.] CR 85-22 Dynamic friction of bobsled runners on ice. Huber, N.P., et
MP 1822	p.235-242 ₃ MP 1173	ai, (1985, 26p.) MP 2002
Dielectric properties at 4.75 GHz of saline ice slabs. Arcone, S.A., et al, [1985, p.83-86] MP 1911	Prazil ice formation in turbulent flow. Müller, A., et al., 1978, p.219-2341 MP 1135	Some effects of friction on ice forces against vertical struc- tures. Kato, K., et al, (1986, p.528-533) MP 2036
R.M., et al, (1985, p.151-167) MP 1962	Remote sensing of massive ice in permafrost along pipelines in Alaska. Kovacs, A., et al, [1979, p.268-279]	Laboratory and field studies of ice friction coefficient. Tatin- claux, J.C., et al, 1986, p.389-400; MP 2126
los electrical properties. Gow, A.J., (1985, p.76-82)	MP 1178	Ice growth
Ico erealen	River ice. Ashton, G.D., [1979, p.38-45] MP 1178 Modeling of ice in rivers. Ashton, G.D., [1979, p.14/1-	Growth and mechanical properties of river and lake ice. Ramscier, R.O., [1972, 243p.] MP 1883
Sediment displacement in the Ottauquechee River—1975- 1978. Martinson, C.R., [1980, 14p.] SR 88-29	14/26 MP 1335 Porcessing ice formation and breakup on Lake Champlain.	Structural growth of lake ice. Gow, A.J., et al, [1977, 24p.] CR 77-01
Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., [1982, 26p.] SR 82-31	Batea, R.E., et al, (1979, 21p.) CR 79-26	Seasonal variations in apparent sea ice viscosity on the geo-
Reservoir bank erosion caused by ice. Gatto, L.W., [1984,	Winter thermal structure, ice conditions and climate of Lake Champiain. Betes, R.E., [1980, 26p.] CR 89-82	physical scale. Hibler, W.D., III, et al, [1977, p.87-90] MP 900
p.203-214 ₁ MP 1787	Extending the useful life of DYE-2 to 1986. Tobiasson, W., et al, [1980, 37p.] SR 98-13	Characteristics of ice on two Vermont rivers. Deck, D.S., [1978, 30p.] SR 78-36
AIDJEX radar observations. Thompson, T.W., et al, (1972, p.1-16) MP 969	ice formation and breakup on Lake Champisin. Bates, R.E., [1980, p.125-143] MP 1429	River ice. Ashton, G.D., (1979, p.38-45) MP 1178 Accelerated ice growth in rivers. Calkins, D.J., (1979, 5p.)
Dynamics of near-shore ice. Weeks, W.F., et al, [1976, p.9-	Numerical solutions for rigid-ice model of secondary frost	CR 79-14
	heave. O'Neill, K., et al, [1980, p.656-669] MP 1454	Ice formation and breakup on Lake Champlain. Bates, R.E., 1980, p.125-143 ₁ MIP 1429
river ice jams. Tatinclaux, J.C., et al. (1977, 45p.)	Preshwater ice growth, motion, and decay. Ashton, G.D., [1980, p.261-304] MP 1299	Application of a numerical sea ice model to the East Green- land area. Tucker, W.B., (1981, 109p.) MP 1535
Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] MP 1751	Sea ice growth, drift, and decay. Hibler, W.D., III, [1980,	Tests of frazil collector lines to assist ice cover formation.
Arching of model ice floes at bridge piers. Calkins, D.J.,	Ice jams and meteorological data for three winters, Ottauque-	Perham, R.E., [1981, p.442-448] MP 1488 Using see ice to measure vertical heat flux in the ocean.
[1976, p.495-507] MP 1134 Modeling of ice in rivers. Ashton, G.D., [1979, p.14/1-	chee River, Vt. Bates, R.B., et al, [1981, 27p.] CR 81-61	McPhee, M.G., et al. [1982, p.2071-2074] MP 1521 Ice growth and circulation in Kachemak Bay, Alaska. Daly,
14/26 MP 1335 Break-up of the Yukon River at the Haul Road Bridge: 1979.	See ice rubble formations off the NE Bering See and Norton Sound. Kovacs, A., [1981, p.1348-1363] MP 1527	S.F., (1982, p.(C)1-(C)9) MP 1501
Stephena, C.A., et al. [1979, 22p. + Pigs.] MP 1315	See ice piling at Fairway Rock, Bering Strait, Alaska.	Ice growth on Post Pond, 1973-1982. Gow, A.J., et al, [1983, 25p.] CR 83-84
Freshwater ice growth, motion, and decay. Ashton, G.D., [1980, p.261-304] MP 1299	Kovacs, A., et al, [1981, p.985-1000] MP 1460 Ice segregation in a frozen soil column. Guymon, G.L., et	Structure to form an ice cover on river rapids in winter. Per- ham, R.B., [1986, p.439-450] MP 2128
Method for measuring brash ice thickness with impulse rader. Martinson, C.R., et al, 1981, 10p.; SR \$1-11	al, [1981, p.127-140] MP 1534 Tests of frazil collector lines to assist ice cover formation.	Frazil ice pebbles, Tanana River, Alaska. Chacho, B.F., et
Force distribution in a fragmented ice cover. Daly, S.F., et al., r1982, p.374-387; MP 1531	Perham, R.E., [1981, p.442-448] MP 1488	Frazil ice measurements in CRREL's flume facility. Daly,
Physical and structural characteristics of antarctic sea ice.	Preezing and blocking of water pipes. Carey, K.L., [1982, 11p.]	S.F., et al, [1986, p.427-438] MP 2127 Ice hardness
Gow, A.J., et al, [1982, p.113-117] MP 1548 Characteristics of multi-year pressure ridges. Kovacs, A.,	Initial stage of the formation of soil-laden ice lenses. Takagi, S., (1982, p.223-232) MP 1996	Laboratory investigation of the kinetic friction coefficient of ice. Forland, K.A., et al, [1984, p.19-28] MP 1825
(1983, p.173-182) MP 1698 Size and shape of ice floss in the Baltic Sea in spring. Lep-	Case study of land treatment in a cold climate—West Dover, Vermont. Bouzoun, J.R., et al, [1982, 96p.]	Ice islands
päranta, M., (1983, p.127-136) MIP 2061	CR 82-44	Investigation of ice islands in Babbage Bight. Kovacs, A., et al., [1971, 46 leaves] MP 1381
Ice forces on a bridge pier, Ottauquechee River, Vermont. Sodhi, D.S., et al, [1983, 6p.] CR 83-32	Growth of black ice, snow ice and snow thickness, subarctic basins. Leppkranta, M., [1983, p.59-70] MP 2063	Islands of grounded see ice. Kovacs, A., et al., 1976, 24p.; CR 76-84
Force distribution in a fragmented ice cover. Stewart, D.M., et al, [1984, 16p.] CR 84-67	Characteristics of multi-year pressure ridges. Kovacs, A., [1983, p.173-182] MIP 1696	Dynamics of near-shore ice. Weeks, W.F., et al, [1976, p.9-
Mechanism for floe clustering in the marginal ice zone. Lep- pitrants, M., et al., (1984, p.73-76) MP 1785	Ico-blocked drainage: problems and processes. Carey, K.L., [1983, 9p.]	34 ₂ MP 1390 Islands of grounded sea ice. Dehn, W.F., et al, [1976, p.35-
On the rheology of a broken ice field due to floe collision.	Physical mechanism for establishing algal populations in frazil	50 ₁ MP 967 Iceberg thickness and crack detection. Kovacs, A., <u>1</u> 1978,
Shen, H., et al. [1984, p.29-34] MP 1812 Ice block stability. Daly, S.F., [1984, p.544-548]	ice. Garrison, D.L., et al., (1983, p.363-365) MP 1717	p.131-145 ₁ MP 1128
MP 1972 Level ice breaking by a simple wedge. Tatinclaux, J.C.,	Mechanics of ice jam formation in rivers. Ackermann, N.L., et al, [1983, 14p.] CR 83-31	Destruction of ice islands with explosives. Mellor, M., et al, [1978, p.753-765] MP 1018
[1985, 46p.] CR 85-22 Ice floe distribution in the wake of a simple wedge. Tatin-	Ice observation program on the semisubmersible drilling ves- sel SEDCO 708. Minsk, L.D., [1984, 14p.]	Profiles of pressure ridges and ice islands in the Beaufort Sea. Hnatiuk, J., et al, [1978, p.519-532] MP 1187
claux, J.C., [1986, p.622-629] MP 2038	SR 84-02	Mechanical properties of ice in the Arctic seas. Weeks,
Ice fog Radiation and evaporation heat loss during ice fog conditions.	St. Lawrence River freeze-up forecast. Shen, H.T., et al, [1984, p.177-190] MP 1713	Ice island fragment in Stefansson Sound, Alaska. Kovaca,
McFadden, T., (1975, p.18-27) MF 1051 Suppression of ice fog from cooling ponds. McFadden, T.,	Icing rate on stationary structures under marine conditions. Itagaki, K., [1984, 9p.] CR 84-12	A., [1985, p.101-115] MP 1900 Ioe properties in a grounded man-made ice island. Cox,
[1976, 78p.] CR 76-43	Computer simulation of ice cover formation in the Upper St.	G.F.N., et al., [1986, p.135-142] MP 2032 Ice jenns
Ice fog suppression using monomolecular films. McFadden, T., [1977, p.361-367] MP 956	Lawrence River. Shen, H.T., et al, (1984, p.227-245) MP 1814	Use of explosives in removing ice jams. Frankenstein, G.E.,
Ice fog suppression using reinforced thin chemical films. McFadden, T., et al, [1978, 23p.] CR 78-26	Ice jam research needs. Gerard, R., [1984, p.181-193] MP 1813	et al, (1970, 10p.) MIP 1021 River ice problems. Burgi, P.H., et al, (1974, p.1-15)
Ice for suppression using thin chemical films. McPadden, T., et al, [1979, 44p.] MP 1192	Frazil ice formation. Ettema, R., et al., [1984, 445.] CR 84-18	MI ⁵ 1002 Third International Symposium on Ice Problems, 1975.
Ice fog suppression in Arctic communities. McFadden, T.,	Ice bands in turbulent pipe flow. Ashton, G.D., 1984,	Prankenstein, G.E., ed, [1975, 627p.] MP 845
[1980, p.54-65] MP 1387 Suppression of ice fog from the Fort Wainwright, Alaska,	Forecasting water temperature decline and freeze-up in rivers.	Mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al, [1976, 97p.] MP 1060
cooling pond. Walker, K.E., et al, [1982, 349.]	Shen, H.T., et al, [1984, 17p.] CR 84-19 Solving problems of ice-blocked drainage. Carey, K.L.,	Potential river ice jams at Windsor, Vermont. Calkins, D.J., et al, (1976, 31p.) CR 76-31
Ice fog as an electro-optical obscurant. Koh, G., 1985,	[1984, 9p.] TD 84-82 Mathematical modeling of river ice processes. Shen, H.T.,	Laboratory investigation of the mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al, [1977, 45p.]
Toe ferecasting	(1984, p.554-558) MP 1973	CR 77-09
Ice accretion on ships. Itagaki, K., [1977, 22p.]	Technique for observing freezing fronts. Colbeck, S.C., (1985, p.13-20) MP 1861	Air photo interpretation of a small ice jam. DenHartog, S.L., [1977, p.705-719] MP 935
Ice formation and breakup on Lake Champiain. Bates, R.E., [1980, p.125-143] MP 1429	Grain growth and the creep behavior of ice. Cole, D.M., [1985, p.187-189] MP 1862	Ice arching and the drift of pack ice through restricted chan- nels. Sodhi, D.S., [1977, 11p.] CR 77-18
Current procedures for forecasting aviation icing. Tucker,	Data acquisition in USACRREL's flume facility. Daly, S.F., et al, [1985, p.1053-1058] MP 2009	Aerial photointerpretation of a small ice jam. DenHartog. S.L., [1977, 17p.] SR 77-32
W.B., [1983, 31p.] SR 83-24 Ice conditions on the Ohio and Illinois rivers, 1972-1985.	Ice triction	Physical measurement of ice jams 1976-77 field season.
Gatto, L.W., [1985, p.856-861] MP 1914 St. Lawrence River freeze-up forecast. Foliyn, E.P., et al,	Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065	Wuebben, J.L., et al., [1978, 19p.] SR 78-63 Investigation of ice clogged channels in the St. Marys River. Mellor, M., et al., [1978, 73p.] MP 1176
[1986, p.467-481] MP 2120	Abnormal internal friction peaks in single-crystal ice. Stall-man, P.B., et al, [1977, 15p.] SR 77-23	Mellor, M., et al., (1978, 73p.) MP 1170 Physical measurements of river ice jams. Calkins, D.J.,
Ice fermation Temperature and flow conditions during the formation of	Ship resistance in thick brash ice. Mellor, M., [1980, p.305-	(1978, p.693-695) MP 1159
river ice. Ashton, G.D., et al, [1970, 12p.] MP 1723	321 ₁ MP 1329 Model tests in ice of a Canadian Coast Guard R-class ice-	River channel characteristics at selected ice jam sites in Vermont. Gatto, L.W., [1978, 52p.] CR 78-25
Seasonal regime and hydrological significance of stream icings in central Alsaka. Kane, D.L., et al, ¿1973, p.528-	breaker. Tatinclaux, J.C., (1984, 24p.) SR 84-66 Laboratory investigation of the kinetic friction coefficient of	River ice. Ashton, G.D., [1979, p.38-45] MP 1178 Modeling of ice in rivers. Ashton, G.D., [1979, p.14/1-
	ice. Forland, K.A., et al, 1984, p.19-28; MIP 1825 Kinetic friction coefficient of ice. Porland, K.A., et al,	14/26 ₁ MP 1335 Freshwater ice growth, motion, and decay. Ashton, G.D.,
540] MP 1026 River ice problems. Burgi, P.H., et al, [1974, p.1-15] MP 1002	(1985, 40p.) CR 85-86	(1980, p.261-304) MIP 1299

Ice jams (cent.) Ice jams and messorological data for three winters, Ottauque-	Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al. [1979, 32p.] SR 79-69	loe forces on rigid, vertical, cylindrical structures. Sodhi, D.S., et al, [1984, 36p.] CR 84-33
chee River, Vt. Bates, R.B., et al, [1981, 27p.]	Modeling of ice in rivers. Ashton, G.D., [1979, p.14/1-14/26] MP 1335	In-ice calibration tests for an elongated, uniaxial brass ice stress sensor. Johnson, J. J., [1985, p.244-249]
loe jam problems at Oil City, Pennsylvania. Deck, D.S., et	Buckling analysis of wedge-shaped floating ice sheets. Sod-	MP 1859
al, (1981, 19p.) SR 81-89 los control arrangement for winter navigation. Perham,	hi, D.S., [1979, p.797-810] MP 1232 Log thickness-tensile stress relationship for load-bearing ice.	Offshore Mechanics and Arctic Engineering Symposium, 4th, 1985. [1985, 2 vols.] MIP 2105
R.E., [1981, p.1096-1103] MP 1449 Modeling hydrologic impacts of winter navigation. Daly,	Johnson, P.R., [1980, 11p.] SR 80-09 Ice engineering. O'Steen, D.A., [1980, p.41-47]	Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.46-54] MIP 1915
S.F., et al. [1981, p.1073-1080] MP 1445	MP 1602	Arctic ice and drilling structures. Sodhi, D.S., [1985, p.63-69] MP 2119
Gingths, M., et al., [1981, p.342-350] MIP 1733	Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) SR 86-22	Real-time measurements of uplifting ice forces. Zabilansky,
Port Huron ice control model studies. Calkins, D.J., et al, (1982, p.361-373) MP 1530	Ice laboratory facilities for solving ice problems. Franken- stein, G.E., [1980, p.93-103] MP 1301	L.J., _[1985] , p.253-259 _] MP 2092 Kadluk ice stress measurement program. Johnson, J.B., et al,
Ice jame and flooding on Ottauquechee River, VT. Bates, R., et al. (1982, 25p.) SR 82-96	Working group on ice forces on structures. Carstens, T., ed. [1980, 146p.] SR 98-26	[1985, p.88-100] MP 1899 Sheet ice forces on a conical structure: an experimental study.
loe jams in shallow rivers with floodplain flow. Calkins, D.J., [1983, p.538-548] MP 1644	Review of buckling analyses of ice sheets. Sodhi, D.S., et al,	Sodhi, D.S., et al, (1985, p.643-655) MP 1966
Asymmetric plane flow with application to ice jame. Tatin-	r 1980, p. 131-1467 MIP 1322 Single and double reaction beam load cells for measuring ice	Compressive strength of multi-year sea ice. Kovaca, A., [1985, p.116-127] MP 1901
claux, J.C., et al, 1983, p.1540-1556; MP 1645 Mechanics of ice jam formation in rivers. Ackermann, N.L.,	forces. Johnson, P.R., et al, [1980, 17p.] CR 80-25 leing on structures. Minsk, L.D., [1980, 18p.]	Instrumentation for an uplifting ice force model. Zabilansky, L.J., 1985, p.1430-1435, MIP 2091
et al, [1983, 14p.] CR 83-31 Ice-related flood frequency analysis: application of analytical	CR 90-31	In-ice calibration tests for an elongate, uniaxial bras, ice stress sensor. Johnson, J.B., (1985, p.506-510) MP 1966
estimates. Gerard, R., et al, (1984, p.85-101) MP 1712	lce force measurement on the Yukon River bridge. McFadden, T., et al. [1981, p.749-777] MP 1396	Crushing of ice sheet against rigid cylindrical structures.
Ice jams in shallow rivers with floodplain flow: Discussion.	Investigation of the acoustic emission and deformation re- sponse of finite ice plates. Xirouchakis, P.C., et al, 1981,	Sodhi, D.S., et al. [1986, p.1-12] MCP 2018 loc cover research—present state and future needs. Kerr,
Beltacs, S., [1984, p.370-371] MP 1796 Ice cover melting in a shallow river. Calkins, D.J., [1984,	19p. ₁ CR 81-06	A.D., et al, [1986, p.384-399] MP 2004 Vibration analysis of the Yamachiche lightpier. Haynes,
p.255-265 ₁ MP 1763 Ice jam research needs. Gerard, R., (1984, p.181-193 ₁	On the buckling force of floating ice plates. Kerr, A.D., [1981, 7p.] CR 81-69	F.D., [1986, p.238-241] MP 1989
MP 1813	State of the art of ship model testing in ice. Vance, G.P., [1981, p.693-706] MP 1573	Offshore Mechanics and Arctic Engineering Symposium, 5th, 1986, [1986, 4 vols.] MP 2031
Controlling river ice to alleviate ice jam flooding. Deck, D.S., (1984, p.69-76) MP 1885	Acoustic emission and deformation response of finite ice	Some effects of friction on ice forces against vertical struc- tures. Kato, K., et al, [1986, p.528-533] MP 2036
Cold facts of ice jams: case studies of mitigation methods. Calkins, D.J., [1984, p.39-47] MIP 1793	plates. Xirouchakia, P.C., et al, (1981, p.385-394) MP 1455	Impact ice force and pressure: An experimental study with
Salmon River ice jama. Cunningham, L.L., et al, [1984,	Dynamic ice-structure interaction analysis for narrow vertical structures. Eranti, E., et al, [1981, p.472-479]	urea ice. Sodhi, D.S., et al. (1986, p.569-576; MP 2037
p.529-533; MP 1796 Method of detecting voids in rubbled ice. Tucker, W.B., et	MP 1456 Modeling hydrologic impacts of winter navigation. Daly,	Ice properties in a grounded man-made ice island. Cox, G.F.N., et al, [1986, p.135-142] MP 2032
al, (1984, p.183-188) MP 1772 Controlling river ice to alleviate ice jam flooding. Deck,	S.F., et al, (1981, p.1073-1080) MIP 1445	Ice mechanics
D.S., (1984, p.524-528) MP 1795	Foundations of structures in polar waters. Chamberlain, B.J., [1981, 16p.] SR 81-25	Growth and mechanical properties of river and lake ice. Ramseier, R.O., [1972, 243p.] MP 1883
Ice jam flood prevention measures, Lamoille River, Hardwick VT. Calkins, D.J., [1985, p.149-168] MP 1940	Sea ice rubble formations in the Bering Sea and Norton Sound, Alaska. Kovacs, A., [1981, 23p.] SE 81-34	ICE MECHANICS Impact of spheres on ice. Closure. Yen, YC., et al.
Construction and calibration of the Ottauquechee River mod- el. Gooch, G., [1985, 10p.] SR 85-13	Port Huron ice control model studies. Calkins, D.J., et al,	[1972, p.473] MIP 988
Cazenovia Creek Model data acquisition system. Bennett,	[1982, p.361-373] MP 1530 Force measurements and analysis of river ice break up.	Ice mechanics Mesoscale deformation of sea ice from satellite imagery.
B.M., et al. (1985, p.1424-1429) MP 2090 Upper Delaware River ice control—a case study. Zufelt,	Deck, D.S., (1982, p.303-336) MP 1739 On forecasting mesoscale ice dynamics and build-up. Hibler,	Anderson, D.M., et al, (1973, 2p., NIP 1120 River ice problems. Burgi, P.H., et al, (1974, p.1-15)
J.B., et al, (1986, p.760-770) MP 2005 Hydrologic aspects of ice jams. Calkins, D.J., (1986, p.603-	W.D., III, et al, [1983, p.110-115] MIP 1625	MP 1002
609 ₇ MP 2116	Buckling loads of floating ice on structures. Sodhi, D.S., et al, [1983, p.260-265] MP 1626	Results of the US contribution to the Joint US/USSR Bering Sea Experiment. Campbell, W.J., et al, [1974, 1979.]
Potential solution to ice jam flooding: Salmon River, Idaho. Barickson, J., et al. (1986, p.15-25) MP 2131	Method for determining ice loads on offshore structures. Johnson, J.B., [1983, p.124-128] MP 2886	MP 1032 Ice dynamics, Canadian Archipelago and adjacent Arctic ba-
Ice leases Segregation-freezing temperature as the cause of suction	Effect of vessel size on shorelines along the Great Lakes chan-	sin. Ramseier, R.O., et al, [1975, p.853-877]
force. Takagi, S., (1977, p.59-66) MP 901 Segregation freezing as the cause of suction force for ice lens	nels. Wuebben, J.L., [1983, 62p.] SR 83-11 Dynamic buckling of floating ice sheets. Sodhi, D.S.,	interpretation of the tensile strength of ice under triaxial
formation. Takagi, S., [1978, p.45-51] MP 1081	[1983, p.822-833] MP 1667 Protection of offshore arctic structures by explosives. Mel-	stress. Nevel, D.E., et al, [1976, p.375-387] MP 996
Segregation freezing as the cause of suction force for ice lens formation. Takagi, S., [1978, 13p.] CR 78-96	lor, M., (1983, p.310-322) MP 1605	Sea ice engineering. Assur, A., [1976, p.231-234] MIP 906
Pundamentals of ice lens formation. Takagi, S., 1978, p.235-242; MP 1173	Atmospheric icing of structures. Minsk, L.D., ed, [1983, 366p.] SR \$3-17	Mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al, [1976, 97p.] MP 1060
Mechanical properties of frozen ground. Ladanyi, B., et al,	Field measurements of combined icing and wind loads on wires. Govoni, J.W., et al, [1983, p.205-215]	Creep theory for a floating ice sheet. Nevel, D.B., [1976,
(1979, p.7-18) MP 1726 Numerical solutions for rigid-ice model of secondary frost	MP 1637	98p. ₁ SE 76-64 Passage of ice at hydraulic structures. Calkins, D.J., et al,
heave. O'Neill, K., et al, [1980, p.656-669] MP 1454	Ice forces on model bridge piers. Haynes, F.D., et al, 1983, 11p. ₁ CR 83-19	[1976, p.1726-1736] MP 966 Dynamics of near-shore ice. Weeks, W.F., et al, [1976, p.9-
Initial stage of the formation of soil-laden ice lenses. Takagi, S., [1982, p.223-232] MP 1596	Offshore petroleum production in ice-covered waters. Tuck- er, W.B., [1983, p.207-215] MIP 2006	34 ₁ MP 1300
investigation of transient processes in an advancing zone of	Ice action on two cylindrical structures. Kato, K., et al. [1983, p.159-166] MP 1643	Potential river ice jams at Windsor, Vermont. Calkins, D.J., et al, [1976, 31p.] CR 76-31
freezing. McGaw, R., et al, [1983, p.821-825] MP 1663	Measurement of ice forces on structures. Sodhi, D.S., et al,	Internal structure and crystal fabrics of the West Antarctic ice sheet. Gow, A.J., et al, [1976, 25p.] CR 76-35
Field tests of a frost-heave model. Guymon, G.L., et al. (1983, p.409-414) MP 1657	[1983, p.139-155] MP 1641 Methods of ice control. Frankenstein, G.E., et al, [1983,	Sea ice properties and geometry. Weeks, W.F., (1976, p.137-171) MP 918
loe segregation and frost heaving, [1984, 72p.]	p.204-215 ₃ MIP 1642	Structural growth of lake ice. Gow, A.J., et al, [1977, 24p.]
MP 1809 Exploration of a rigid ice model of frost heave. O'Neill, K.,	Ice action on pairs of cylindrical and conical structures. Kato, K., et al., 1983, 35p. ₂ CR 83-25	CR 77-01 Dynamics of near-shore ice. Kovacs, A., et al, [1977,
et al, _[1985, p.281-296] MP 1880 Ice leads	Ice forces on a bridge pier, Ottauquechee River, Vermont. Sodhi, D.S., et al, [1983, 6p.] CR \$3-32	p.106-112 ₃ NEP 924
Structures in ice infested water. Assur, A., [1972, p.93-97]	Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, [1984, p.235-259] MP 1674	Laboratory investigation of the mechanics and hydraulics of river ice jams. Tatinclaux, J.C., et al., [1977, 45p.] CR 77-09
MP 1016 Investigation of ice forces on vertical structures. Hirayama,	Porce distribution in a fragmented ice cover. Stewart, D.M.,	Air photo interpretation of a small ice jam. DenHartog, S.L.,
K., et al, [1974, 153p.] MP 1041 Third International Symposium on Ice Problems, 1975.		
Prankenstein, G.B., ed, [1975, 627p.] MP 845	et al, [1984, 16p.] CR 84-87 Ice resistance tests on two models of the WTGB icebreaker.	[1977, p.705-719] MP 935 Regimeering properties of sea icc. Schwarz, J., et al. r1977.
	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., [1984, p.627-638] MP 1716	Engineering properties of sea icc. Schwarz, J., et al., [1977, p.499-531] MP 1065
Bibliography on harbor and channel design in cold regions. Haynes, F.D., 1976, 32p.; CR 76-03	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., [1984, p.627-638] MP 1716 Ice action on two cylindrical structures. Kato, K., et al., [1984, p.107-112] MP 1741	Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-53] MP 1065 Movement of coastal sea ice near Prudhoe Bay. Weeks, W.F., et al., [1977, p.533-546] MP 1066
Bibliography on harbor and channel design in cold regions. Haynes, F.D., [1976, 32p.] Passage of ice at hydraulic structures. Calkins, D.J., et al. [1976, p.1726-1736] MP 966	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716. Ice action on two cylindrical structures. Kato, K., et al., (1984, p.107-112) MP 1741. Combined icing and wind loads on a simulated power line test span. Govoni, J.W., et al., (1984, 7p.) MP 2114.	Bagineering properties of sea icc. Schwarz, J., et al., [1977, p.499-53] MP 1065 Movement of coastal sea icc near Prudhoe Bay. Weeks,
Bibliography on harbor and channel design in cold regions. Haynes, F.D., [1976, 32p.] CR 76-03 Passage of ice at hydraulic structures. Calkins, D.J., et al., [1976, p.1726-1736] MP 966 Force estimate and field measurements of the St. Marya River	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., [1984, p.627-638] MP 1716 Ice action on two cylindrical structures. Kato, K., et al., [1984, p.107-112] MP 1741 Combined icing and wind loads on a simulated power line test span. Govoni, J.W., et al., [1984, 7p.] MP 2114 Computational mechanics in arctic engineering. Sodhi, D.S.,	Engineering properties of sea icc. Schwarz, J., et al., [1977, p.499-531] MP 1065 Movement of coastal sea icc near Prudhoe Bay. Weeks, W.F., et al., [1977, p.533-546] MP 1066 Dynamics of near-shore icc. Kovacs, A., et al., [1977, p.411-424] MP 1076 Some elements of iccberg technology. Weeks, W.F., et al.
Bibliography on harbor and channel design in cold regions. Haynes, F.D., 1976, 32p.; Passage of ice at hydraulic structures. Calkins, D.J., et al., (1976, p.1726-1736; Force estimate and field measurements of the St. Marya River ice booms. Perham, R.B., (1977, 26p.) CR 77-04 Yukon River breakup 1976. Johnson, P., et al., (1977,	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., [1984, p.627-638] MP 1716. Ice action on two cylindrical structures. Kato, K., et al., [1984, p.107-112] MP 1741. Combined icing and wind loads on a simulated power line test span. Govoni, J.W., et al., [1984, 7p.] MP 2114. Computational mechanics in arctic engineering. Sodhi, D.S., (1984, p.351-374) MP 2872. Bvaluation of a biaxial ice stress sensor. Cox, G.F.N.,	Engineering properties of sea icc. Schwarz, J., et al., 1977, p. 499-531; Movement of coastal sea icc near Prudhoe Bay. Weeks, W.F., et al., 1977, p. 533-546; Dynamics of near-shore icc. Kovacs, A., et al., 1977, p. 411-424; Some elements of iceberg technology. Weeks, W.F., et al., (1978, p. 45-98) MP 1616 Model simulation of near shore icc drift, deformation and
Bibliography on harbor and channel design in cold regions. Haynes, F.D., [1976, 32p.] Passage of ice at hydraulic structures. Calkins, D.J., et al., [1976, p.1726-1736-] Force estimate and field measurements of the St. Marys River ice booms. Perham, R.R., [1977, 26p.] Yukon River breakup 1976. Johnson, P., et al., [1977, p.592-596-] Intermittent ice forces acting on inclined wedges. Tryde, P.,	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Ice action on two cylindrical structures. Kato, K., et al., (1984, p.107-112) MP 1741 Combined icing and wind loads on a simulated power line test span. Govoni, J.W., et al., (1984, 7p.) MP 2114 Computational mechanics in arctic engineering. (1984, p.351-374) Evaluation of a biaxial ice stress sensor. Cox, G.F.N., (1984, p.49-361) Laboratory investigation of the kinetic friction coefficient of	Engineering properties of sea icc. Schwarz, J., et al., [1977, p.499-531] MP 1665 Movement of coastal sea icc near Prudhoe Bay. Weeks, W.F., et al., [1977, p.533-546] MP 1666 Dynamics of near-shore icc. Kovacs, A., et al., [1977, p.411-424] MP 1676 Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.45-98] MP 1616
Bibliography on harbor and channel design in cold regions. Haynes, F.D., 1976, 32p.; Passage of ice at hydraulic structures. Calkins, D.J., et al., (1976, p.1726-1736; Force estimate and field measurements of the St. Marya River ice booms. Perham, R.B., (1977, 26p.) CR 77-04. Yukon River breakup 1976. Johnson, P., et al., (1977, p.592-596) Intermittent ice forces acting on inclined wedges. (1977, 26p.) CR 77-26.	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., [1984, p.627-638] MP 1716. Ice action on two cylindrical structures. Kato, K., et al., [1984, p.107-112] MP 1741. Combined icing and wind loads on a simulated power line tas span. Govoni, J.W., et al., [1984, 7p.] MP 2114. Computational mechanics in arctic engineering. Sodhi, D.S., (1984, p.351-374) MP 2872. Bvaluation of a biaxial ice stress sensor. Cox, G.F.N., [1984, p.349-361]. MP 1836. Laboratory investigation of the kinetic friction coefficient of ice. Forland, K.A., et al., [1984, p.19-28] MP 1828.	Engineering properties of sea icc. Schwarz, J., et al., 1977, p. 499-53]. MP 1065 Movement of coastal sea icc near Prudhoe Bay. Weeks, W.F., et al., 1977, p. 533-546; MP 1066 Dynamics of near-shore icc. Kovacs, A., et al., 1977, p. 411-424; MP 1076 Some elements of iceberg technology. Weeks, W.F., et al., (1978, p. 45-98;) MP 1616 Model simulation of near shore icc drift, deformation and thickness. Hibler, W.D., III, (1978, p. 33-44) MMP 1010 Axial double point-load tests on snow and icc. Kovacs, A.,
Bibliography on harbor and channel design in cold regions. Haynes, F.D., [1976, 32p.] Passage of ice at hydraulic structures. Calkins, D.J., et al., [1976, p.1726-1736,] Force estimate and field measurements of the St. Marys River ice booms. Perham, R.E., [1977, 26p.] CR 77-64 Yukon River breakup 1976. Johnson, P., et al., [1977, p.592-596,] Intermittent ice forces acting on inclined wedges. Tryde, P., [1977, 26p.] Ice and ship effects on the St. Marys River ice booms. Perham, R.E., [1978, p.222-230,] MP 1617	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., (1984, p.627-638) MP 1716 Ice action on two cylindrical structures. Kato, K., et al., (1984, p.107-112) MP 1741 Combined icing and wind loads on a simulated power line test span. Govoni, J.W., et al., (1984, 7p.) MP 2114 Computational mechanics in arctic engineering. (1984, p.351-374) MP 2872 Bvaluation of a biaxial ice stress sensor. Cox, G.F.N., (1984, p.349-361) Laboratory investigation of the kinetic friction coefficient of ice. Forland, K.A., et al., (1984, p.19-28) MP 1825 Offshore oil in the Alaskan Arctic. Weeks, W.F., et al., (1984, p.371-378)	Engineering properties of sea icc. Schwarz, J., et al., 1977, p. 499-531; MV 1995-531; Movement of coastal sea icc near Prudhoe Bay. Weeks, W.F., et al., 1977, p. 533-546; Dynamics of near-shore icc. Kovacs, A., et al., 1977, p. 411-424; Some elements of iceberg technology. Weeks, W.F., et al., (1978, p. 45-98). MP 1616 Model simulation of near shore icc drift, deformation and thickness. Hibler, W.D., III, (1978, p. 33-44). MP 1610 Axial double point-load tests on snow and icc. CR. 78-61, Report of the ITTC panel on testing in icc, 1978. Pranken-
Bibliography on harbor and channel design in cold regions. Haynes, F.D., [1976, 32p.] Passage of ice at hydraulic structures. Calkins, D.J., et al., (1976, p.1726-1736) Force estimate and field measurements of the St. Marya River ice booms. Perham, R.E., [1977, 26p.] Yukon River breakup 1976. Johnson, P., et al., [1977, p.592-596) Intermittent ice forces acting on inclined wedges. (1977, 26p.) Ice and ship effects on the St. Marya River ice booms. Perham, R.E., [1978, p.222-230] Loe cover forces on structures. Kert, A.D., [1978, p.123-134] MP 379	Ice resistance texts on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., [1984, p.627-638] MP 1716 Ice action on two oylindrical structures. Kato, K., et al., [1984, p.107-112] Combined icing and wind loads on a simulated power line test span. Govoni, J.W., et al., [1984, 7p.] MP 2114 Computational mechanics in arctic engineering. Sodhi, D.S., (1984, p.351-374) Bvalustion of a biaxial ice stress sensor. Cox. G.F.N., (1984, p.349-361) Laboratory investigation of the kinetic friction coefficient of ice. Forland, K.A., et al., [1984, p.19-28] MP 1825 Offshore oil in the Alsakan Arctic. Weeks, W.F., et al., (1984, p.371-378) Forces associated with ice pile-up and ride-up. Sodhi, D.S., et al., (1984, p.239-262) MP 1887	Engineering properties of sea icc. Schwarz, J., et al., 1977, p. 499-531; MP 1965 Movement of coastal sea icc near Prudhoe Bay. Weeks, W.F., et al., 1977, p. 533-546; MP 1966 Dynamics of near-shore icc. Kovacs, A., et al., 1977, p. 411-424; MP 1976 Some elements of iceberg technology. Weeks, W.F., et al., (1978, p. 43-98) MP 1616 Model simulation of near shore icc drift, deformation and thickness. Hibler, W.D., III, (1978, p. 33-44) MP 1910 Axial double point-load tests on snow and icc. Kovacs, A., (1978, 11p.) Report of the ITTC panel on testing in icc, 1978. Prankenstein, G.E., et al., (1978, p. 157-179) MP 1140 River icc. Ashton, G.D., (1978, p. 369-392) MP 1216
Bibliography on harbor and channel design in cold regions. Haynes, F.D., [1976, 32p.] R76-03 Passage of ice at hydraulic structures. Calkins, D.J., et al., [1976, p.1726-1736-] Force estimate and field measurements of the St. Marys River ice booms. Perham, R.S., [1977, 26p.] CR 77-04 Yukon River breakup 1976. Johnson, P., et al., [1977, p.592-596-] Intermittent ice forces acting on inclined wedges. Tryde, P., (1977, 26p.) CR 77-26. Ice and ship effects on the St. Marys River ice booms. Perham, R.S., [1978, p.222-230-] Loe cover forces on structures. Kerr, A.D., [1978, p.123-	Ice resistance texts on two models of the WTGB icebreaker. Tatinclaux, J.C., et al., [1984, p.627-638] MP 1716 Ice action on two cylindrical structures. Kato, K., et al., [1984, p.107-112] MP 1741 Combined icing and wind loads on a simulated power line test span. Govoni, J.W., et al., [1984, 7p.] MP 2114 Computational mechanics in arctic engineering. Sodhi, D.S., (1984, p.351-374) Evaluation of a biaxial ice stress sensor. Cox, G.F.N., Laboratory investigation of the kinetic friction coefficient of ice. Forland, K.A., et al., [1984, p.19-28] MP 1825 Offshore oil in the Alaskan Arctic. Weeks, W.F., et al., (1984, p.371-378) Forces associated with ice pile-up and ride-up. Sodhi, D.S.,	Engineering properties of sea icc. Schwarz, J., et al., 1977, p. 499-531; Movement of coastal sea icc near Prudhoe Bay. Weeks, W.F., et al., 1977, p. 533-546; Dynamics of near-shore icc. Kovacs, A., et al., 1977, p. 411-424; MP 1676 Some elements of iceberg technology. Weeks, W.F., et al., (1978, p. 45-98;) MP 1616 Model simulation of near shore icc drift, deformation and thickness. Hibler, W.D., III, (1978, p. 33-44) MP 1610 Axial double point-load tests on snow and icc. Kovacs, A., (1978, 11p.) Report of the ITTC panel on testing in icc, 1978. Prankenstein, G.E., et al., (1978, p. 157-179) MP 1140

los forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al, (1979, 40p.) MP 1304	Computational mechanics in arctic engineering. Sodhi, D.S., (1984, p.351-374) MP 2072	Bubblers and pumps for melting ice. Ashton, G.D., r1986, p.223-2341 MP 2133
Dynamics of near-shore ice. Kovaca, A., et al, [1979,	Role of sea ice dynamics in modeling CO2 increases. Hibler,	Ice stedels
p.181-207 ₁ MP 1291 Some Bessel function identities arising in ice mechanics prob-	W.D., III, [1984, p.238-253] MP 1749 Forces associated with ice pile-up and ride-up. Sodhi, D.S.,	Structures in ice infested water. Assur, A., [1972, p.93-97] MP 1016
legns. Takagi, S., (1979, 13p.) CR 79-27	et al, [1984, p.239-262] MP 1887	Classification and variation of sea ice ridging in the Arctic
Ultrasonic tests of Byrd Station ice cores. Gow, A.J., et al. (1979, p.147-153) MP 1282	Static determination of Young's modulus in sea ice. Richter- Menge, J.A., 1984, p.283-2861 MP 1789	basin. Hibler, W.D., III, et al, (1974, p.127-146) MIP 1022
Documentation for a two-level dynamic thermodynamic aca	Air-ice-ocean interaction experiments in Arctic marginal ice	Remote sensing program required for the AIDJEX model. Weeks, W.F., et al, (1974, p.22-44) MP 1040
ice model. Hibler, W.D., III, [1980, 35p.] SR 80-06 Los laboratory facilities for solving ice problems. Franken-	zones. [1984, 56p.] SR 84-28 Shore ice override and pileup features, Beaufort Sea.	Modeling pack ice as a viscous-plastic continuum. Hibler,
stein, G.E., [1980, p.93-103] MP 1301	Kovacs, A., [1984, 28p. + map] CR 84-26	W.D., III, [1977, p.46-55] MIP 1164
Some promising trends in ice mechanics. Assur, A., r1980, p.1-15 ₁ MP 1300	Crystalline structure of ures ice sheets. Gow, A.J., 1984, 48p.; CR 84-24	Model simulation of near shore ice drift, deformation and thickness. Hibler, W.D., III, [1978, p.33-44]
Mechanical properties of polycrystalline ice. Mellor, M.,	MIZEX 83 mesoscale sea ice dynamics: initial analysis. Hi-	MP 1010 loc arching and the drift of pack ice through channels. Sod-
[1980, p.217-245] MP 1382 Ship resistance in thick brash ice. Mellor, M., [1980, p.305-	bler, W.D., III, et al., 1984, p.19-28; MP 1811 On the rheology of a broken ice field due to floe collision.	hi, D.S., et al, [1978, p.415-432] MP 1138
321 ₁ MP 1329	Shen, H., et al, [1984, p.29-34] MP 1812	Arching of model ice floes at bridge piers. Calkins, D.J., [1978, p.495-507] MP 1134
Mechanical properties of polycrystalline ice. Hooke, R.L., et al., r1980, p.263-275, MP 1328	MIZEX 84 mesoscale sea ice dynamics: post operations report. Hibler, W.D., III, et al, [1984, p.66-69]	See ice pressure ridges in the Beaufort Sea. Wright, B.D., et
Measurement of the shear stress on the underside of simulated	MP 1257	al, [1978, p.249-271] MP 1132 Some results from a linear-viscous model of the Arctic ice
ice covers. Calkins, D.J., et al. [1980, 11p.] CR 86-24	Surfacing submarines through ice. Assur, A., (1984, p.309-318) MP 1998	cover. Hibler, W.D., III, et al, [1979, p.293-304]
Dynamics of near-shore ice. Kovacs, A., et al, 1981, p.125-135; MP 1599	Arctic sea ice and naval operations. Hibler, W.D., III, et al., r1984, p.67-91; MP 1994	MP 1241 Numerical modeling of sea ice in the seasonal sea ice zone.
p.125-135 ₁ MP 1599 Modeling mesoscale ice dynamics. Hibler, W.D., III, et al,	[1984, p.67-91] MP 1994 Rheology of glacier ice. Jezek, K.C., et al, [1985, p.1335-	Hibler, W.D., III, [1980, p.299-356] MIP 1296
[1981, p.1317-1329] MIP 1526	1337 ₁ MP 1844	Some promising trends in ice mechanics. Assur, A., [1980, p.1-15] MP 1366
Dynamic ice-structure interaction analysis for narrow vertical structures. Eranti, E., et al. (1981, p.472-479)	Numerical modeling of sea ice dynamics and ice thickness. Hibler, W.D., III, [1985, 50p.] CR 85-05	Preliminary results of ice modeling in the Best Greenland
MP 1456	Air-ice ocean interaction in Arctic marginal ice zones:	area. Tucker, W.B., et al, [1981, p.867-878] MP 1438
Measuring mechanical properties of ice. Schwarz, J., et al, [1981, p.245-254] MP 1556	MIZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06	Numerical solutions for a rigid-ice model of secondary frost
Growth, structure, and properties of sea ice. Weeks, W.F.,	Mechanical properties of multi-year pressure ridge samples.	heave. O'Neill, K., et al., (1982, 11p.) CR \$2-13 On modeling the Weddell Sea pack ice. Hibler, W.D., III,
et al, [1982, 130p.] M 82-01 Ice behavior under constant stress and strain. Mellor, M., et	Richter-Menge, J.A., [1985, p.244-251] MP 1936 Modeling sea-ice dynamics. Hibler, W.D., III, [1985,	et al, [1982, p.125-130] MP 1549
al, [1982, p.201-219] MP 1525	p.549-579 _] MP 2001	Application of a numerical sea ice model to the East Green- land area. Tucker, W.B., [1982, 40p.] CR \$2-16
Port Huron ice control model studies. Calkins, D.J., et al. [1982, p.361-373] MP 1530	Grain size and the compressive strength of ice. Cole, D.M., 1985, p.369-374; MP 1907	Modeling fluctuations of arctic sea ice. Hibler, W.D., III, et
Glacier mechanics. Mellor, M., [1982, p.455-474]	Mechanical properties of multi-year sea ice. Phase 2: Test	al, [1982, p.1514-1523] MP 1579 Numerical simulation of the Weddell Sea pack ice. Hibler,
MP 1532 In-situ measurements of the mechanical properties of ice.	results. Cox, G.F.N., et al, [1985, 81p.] CR 85-16 Frazil ice pebbles, Tanana River, Alaska. Chacho, R.F., et	W.D., III, et al, (1983, p.2873-2887) MP 1592
Tatinclaux, J.C., [1982, p.326-334] MP 1555	al, [1986, p.475-483] MP 2130	Sea ice model in wind forcing fields. Tucker, W.B., r1983, 11p., CR \$3-17
Ottauquechee River—analysis of freeze-up processes. Cal- kins, D.J., et al, [1982, p.2-37] MP 1738	Ice melting Towing icebergs. Lonsdale, H.K., et al., (1974, p.2) MP 1020	First-generation model of ice deterioration. Ashton, G.D.,
Physical properties of the ice cover of the Greenland Sea.	MIP 1020	[1983, p.273-278] MIP 2000 Modeling of ice discharge in river models. Calkins, D.J.,
Weeks, W.F., [1982, 27p.] SR 82-28 Hydraulic model study of Port Huron ice control structure.	Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] CR 76-12	(1983, p.285-290) MIP 2081
Calkins, D.J., et al, [1982, 59p.] CR 82-34	Heat transfer between water jets and ice blocks. Yen, YC.,	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al, [1984, p.627-638] MP 1716
Stress/strain/time relations for ice under uniaxial compression. Mellor, M., et al, [1983, p.207-230] MP 1587	[1976, p.299-307] MP 882 Short-term forecasting of water run-off from snow and ice.	Bast Greenland Sea ice variability in large-scale model simu-
Numerical simulation of the Weddell Sea pack ice. Hibler,	Colbeck, S.C., [1977, p.571-588] MP 1067	lations. Walsh, J.E., et al, (1984, p.9-14) MP 1779 Modeling the marginal ice zone. Hibler, W.D., III, ed,
W.D., III, et al, [1983, p.2873-2887] MP 1592 On forecasting mesoscale ice dynamics and build-up. Hibler,	Heat transfer over a vertical melting plate. Yen, YC., et al. [1977, 12p.] CR 77-32	(1984, 99p.) SR 84-67
W.D., III, et al, [1983, p.110-115] MP 1625	Bubbler induced melting of ice covers. Keribar, R., et al,	Analysis of linear sea ice models with an ice margin. Lep- parants, M., (1984, p.31-36) MP 1782
Ses ice model in wind forcing fields. Tucker, W.B., [1983, 11p.] CR 83-17	[1978, p.362-366] MP 1160 Point source bubbler systems to suppress ice. Ashton, G.D.,	Crystalline structure of urea ice sheets used in modeling in the
Mechanical behavior of sea ice. Mellor, M., [1983, 105p.]	[1979, 12p.] CR 79-12	CRREL test basin. Gow, A.J., [1984, p.241-253] MP 1835
M 83-1 Sea ice on the Norton Sound and adjacent Bering Sea coast.	Case study: fresh water supply for Point Hope, Alaska. McFadden, T., et al, [1979, p.1029-1040] MP 1222	Model simulation of 20 years of northern hemisphere sea-ice
Kovaca, A., [1983, p.654-666] MP 1699	Point source bubbler systems to suppress ice. Ashton, G.D.,	fluctuations. Walsh, J.E., et al, [1984, p.170-176] MP 1767
Modeling of ice discharge in river models. Calkins, D.J., 1983, p.285-290, MP 2081	(1979, p.93-100) MP 1326 Maximum thickness and subsequent decay of lake, river and	Role of sea ice dynamics in modeling CO2 increases. Hibler, W.D., III. r1984, p.238-2531 MP 1749
Relationship between creep and strength behavior of ice at	fast sea ice in Canada and Alaska. Bilello, M.A., [1980,	W.D., III, [1984, p.238-253] MP 1749 Exploration of a rigid ice model of frost heave. O'Neill, K.,
failure. Cole, D.M., [1983, p.189-197] MP 1681 Thermodynamic model of soil creep at constant stresses and	160p. ₃ CR 80-06 Continuum ses ice model for a global climate model. Ling.	et al, [1985, p.281-296] MP 1880
strains. Fish, A.M., [1983, 18p.] CR 83-33	C.H., et al, [1980, p.187-196] MP 1622	Numerical simulation of Northern Hemisphere sea ice variability, 1951-1980. Walah, J.E., et al, 1985, p.4847-
Mechanics of ice jam formation in rivers. Ackermann, N.L., et al, [1983, 14p.] CR 83-31	Freshwater ice growth, motion, and decay. Ashton, G.D., [1980, p.261-304] MP 1299	4865 ₁ MP 1882 Modeling and ing dynamics Wilder W.D. III 1985
Mechanical properties of ice in the Arctic seas. Weeks,	Ablation seasons of arctic and antarctic sea ice. Andreas,	Modeling sea-ice dynamics. Hibler, W.D., III, [1985, p.549-579] MP 2001
W.F., et al, [1984, p.235-259] MP 1674 Marginal ice zones: a description of air-ice-ocean interactive	B.L., et al. (1982, p.440-447) MP 1517 Sea ice drag laws and boundary layer during rapid melting.	Role of plastic ice interaction in marginal ice zone dynamics. Lepparanta, M., et al, [1985, p.11,899-11,909]
processes, models and planned experiments. Johannessen, O.M., et al., [1984, p.133-146] MP 1673	McPhee, M.G., [1982, 17p.] CR 82-04	MP 1544
Modified theory of bottom crevasses. Jezek, K.C., [1984,	Performance of a point source bubbler under thick ice. Haynes, F.D., et al, (1982, p.111-124) MP 1529	Ice navigation Third International Symposium on Ice Problems, 1975.
p.1925-1931 ₁ MP 2059 Large-scale ice/ocean model for the marginal ice zone. Hi-	On the differences in ablation seasons of Arctic and Antarctic sea ice. Andress, E.L., et al, (1982, 9p.) CR 82-33	Prankenstein, G.E., ed, [1975, 627p.] MP 845
bler, W.D., III, et al, [1984, p.1-7] MP 1778	Developing a water well for the ice backfilling of DYE-2.	Icebreaker simulation. Nevel, D.E., [1977, 9p.] CR 77-16
On the role of ice interaction in marginal ice zone dynamics. Leppitranta, M., et al, [1984, p.23-29] MP 1781	Rand, J.H., [1982, 19p.] SR 82-32	Ice and navigation related sedimentation. Wuebben, J.L., et
Modeling the marginal ice zone. Hibler, W.D., III, ed,	Soft drink bubbles. Cragin, J.H., [1983, p.71] MIP 1736	al, [1978, p.393-403] MP 1133 Report of the ITTC panel on testing in ice, 1978. Franken-
(1984, 99p.) SR 84-67 Mechanical properties of multi-year sea ice. Phase 1: Test	Melting ice with air bubblers. Carey, K.L., 1983, 11p.; TD 83-01	stein, G.B., et al, [1978, p.157-179] MP 1140
results. Cox, G.F.N., et al, [1984, 105p.] CR 84-09	Field tests of a frost-heave model. Guymon, G.L., et al,	Performance of the St. Marys River ice booms, 1976-77. Perham, R.E., [1978, 13p.] CR 78-24
Mechanical properties of multi-year sea ice. Testing techniques. Mellor, M., et al., {1984, 39p.} CR 84-08	[1983, p.409-414] MP 1657	Break-up dates for the Yukon River; Pt.1. Rampart to White-
Best Greenland Sea ice variability in large-scale model simu-	Lake ice decay. Ashton, G.D., [1983, p.83-86] MP 1684	horse, 1896-1978. Stephens, C.A., et al, [1979, c50 leaves] MP 1317
lations. Walsh, J.E., et al, [1984, p.9-14] MP 1779 Some simple concepts on wind forcing over the marginal ice	Deterioration of floating ice covers. Ashton, G.D., 1984, p.26-33, MP 1676	Evaluation of ice deflectors on the USCG icebreaker Polar
zone. Tucker, W.B., [1984, p.43-48] MP 1783	On the decay and retreat of the ice cover in the summer MIZ.	Star. Vance, G.P., [1980, 37p.] SR 80-84 Cost of ice damage to shoreline structures during navigation.
Prazil ice dynamics. Daly, S.F., (1984, 46p.) M 84-01	Maykut, G.A., [1984, p.15-22] MP 1780	Carey, K.L., [1980, 33p.] SR 80-22
Laboratory investigation of the kinetic friction coefficient of ice. Forland, K.A., et al, [1984, p.19-28] MP 1825	Temperature and interface morphology in a melting ice-water system. Yen, YC., [1984, p.305-325] MP 1727	lce laboratory facilities for solving ice problems. Franken- stein, G.E., [1980, p.93-103] MP 1361
Mechanical properties of sea ice: a status report. Weeks, W.F., et al, [1984, p.135-198] MP 1806	Ice cover melting in a shallow river. Calkins, D.J., [1984,	Clearing ice-clogged shipping channels. Vance, G.P.,
Ice dynamics. Hibler, W.D., III, [1984, 52p.]	Ice deterioration. Ashton, G.D., (1984, p.31-38)	[1980, 13p.] CR 80-28 Toe control at navigation locks. Hanamoto, B., [1981,
M 84-03	MP 1791 Deterioration of floating ice covers. Ashton, G.D., [1985,	p.1088-1095 ₁ MP 1448
[1984, p.297-316] MP 1816	p.177-182 ₁ MP 2122	R.B., (1981, p.1096-1103) MIP 1449
loe flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al, [1984, p.185-190] MP 1824	Heat transfer in water over a melting ice sheet. Lunardini, V.J., [1986, p.227-236] MP 2933	Modeling sydrologic impacts of winter navigation. Daly, S.F., et al, [1981, p.1073-1080] MP 1445

Ice navigation (cost.)	Chemical fractionation of brine in the McMurdo Ice Shelf.	Performance of the St. Marys River ice booms, 1976-77.
Hydraulic model study of Port Huron ice control structure.	Cragin, J.H., et al, [1983, 16p.] CR 83-06	Perham, R.E., [1978, 13p.] CR 78-24
Calkins, D.J., et al., (1982, 59p.) CR 82-34	Thermal patterns in ice under dynamic loading. Fish, A.M., et al, [1983, p.240-243] MP 1742	River ice. Ashton, G.D., (1978, p.369-392) MP 1216 Lee forces on the Yukon River bridge—1978 breakup. John-
Marginal Ice Zone Experiment, Fram Strait/Greenland Sea, 1984. Johannessen, O.M., ed, (1983, 47p.)	Stress measurements in ice. Cox, G.F.N., et al, [1983,	son, P.R., et al., [1979, 40p.] MP 1304
SR 83-12	31p. ₁ CR 83-23	Buckling analysis of wedge-shaped floating ice sheets. Sod-
Ice engineering facility. Zabilansky, L.J., et al, (1983, 12p.	Effect of X-ray irradiation on internal friction and dielectric	hi, D.S., [1979, p.797-810] MIP 1232
+ fig. ₁ MP 2068	relaxation of ice. Itagaki, K., et al, [1983, p.4314-4317] MIP 1670	Towing ships through ice-clogged channels by warping and
Methods of ice control. Frankenstein, G.E., et al, [1983,	Possibility of anomalous relaxation due to the charged dislo-	kedging. Mellor, M., [1979, 21p.] CR 79-21
p.204-215; MP 1642 Marginal ice zones: a description of air-ice-ocean interactive	cation process. Itagaki, K., [1983, p.4261-4264]	Cost of ice damage to shoreline structures during navigation. Carey, K.L., [1980, 33p.] SR 88-22
processes, models and planned experiments. Johannessen,	MP 1669	Review of buckling analyses of ice sheets. Sodhi, D.S., et al.
O.M., et al, [1984, p.133-146] MP 1673	4th report of working group on testing methods in ice. Earle,	[1980, p.131-146] MP 1322
Navigation ice booms on the St. Marys River. Perham, R.E.,	E.N., et al, [1984, p.1-41] MP 1886	Working group on ice forces on structures. Carstens, T., ed,
[1984, 12p.] CR 84-04	Sea ice properties. Tucker, W.B., III, et al, [1984, p.82-83] MP 2136	[1980, [46p.] SR 80-26
Model tests in ice of a Canadian Coast Guard R-class ice- breaker. Tatinclaux, J.C., [1984, 24p.] SR 84-06	Mesoscale air-ice-ocean interaction experiments. Johan-	Ship resistance in thick brash ice. Mellor, M., [1980, p.305-321] MP 1329
Methods of ice control for winter navigation in inland waters.	nessen, O.M., ed, [1984, 176p.] SR 84-29	Ice force measurement on the Yukon River bridge. McFad-
Frankenstein, G.B., et al, [1984, p.329-337] MP 1831	Discrete reflections from thin layers of snow and ice. Jezek,	den, T., et al, [1981, p.749-777] MP 1396
Arctic sea ice and naval operations. Hibler, W.D., III, et al,	K.C., et al, [1984, p.323-331] MP 1871	Dynamic ice-structure interaction analysis for narrow vertical
[1984, p.67-91] MIP 1994	Climatic factors in cold regions surface conditions. Bilello, M.A., (1985, p.508-517) MP 1961	structures. Eranti, E., et al, [1981, p.472-479] MP 1456
Survey of ice problem areas in navigable waterways. Zufelt, J., et al, 1985, 32p., SR 85-02	Pressure ridge and sea ice properties Greenland Sea. Tucker,	State of the art of ship model testing in ice. Vance, G.P.,
J., et al, [1985, 32p.] SR 85-02 Design and model testing of a river ice prow. Tatinclaux,	W.B., et al, [1985, p.214-223] MP 1935	[1981, p.693-706] MP 1573
J.C., [1986, p.137-150] MP 2132	Physical properties of sea ice in the Greenland Sea. Tucker,	Sea ice rubble formations in the Bering Sea and Norton
Ice needles	W.B., et al, [1985, p.177-188] MP 1903 Ice island fragment in Stefansson Sound, Alaska. Kovaca,	Sound, Alaska. Kovacs, A., [1981, 23p.] SR 81-34
Small-scale testing of soils for frost action. Sayward, J.M.,	A., [1985, p.101-115] MP 1900	Porce measurements and analysis of river ice break up. Deck, D.S., [1982, p.303-336] MP 1739
[1979, p.223-231] MP 1309	Physical properties of the sea ice cover. Weeks, W.F.,	Bering Strait sea ice and the Pairway Rock icefoot. Kovaca,
Soil tests for frost action and water migration. Sayward, J.M., [1979, 17 p.] SR 79-17	[1986, p.87-102] MIP 2047	A., et al, [1982, 40p.] CR 82-31
Ico nuclei	Ice pileup	Dynamic ice-structure interaction during continuous crush-
Elemental analyses of ice crystal nuclei and aerosois.	International Workshop on the Seasonal Sea Ice Zone, Mon- terey, California, Feb. 26-Mar.1, 1979. Andersen, B.G.,	ing. Masttanen, M., [1983, 48p.] CR 83-65
Kumai, M., [1977, 5p.] MP 1191	ed, (1980, 357p.) MP 1292	Ice forces on model marine structures. Haynes, F.D., et al, [1983, p.778-787] MP 1606
Frazil ice formation in turbulent flow. Müller, A., et al,	Shore ice pile-up and ride-up: field observations, models,	Dynamic buckling of floating ice sheets. Sodhi, D.S.,
[1978, p.219-234] MP 1135	theoretical analyses. Kovacs, A., et al, [1980, p.209-	[1983, p.822-833] MIP 1607
Optical properties of salt ice. Lane, J.W., [1975, p.363-	298 ₁ MP 1295	Characteristics of multi-year pressure ridges. Kovacs, A.,
372 ₁ MP 854	Dynamics of near-shore ice. Kovacs, A., et al, [1981, p.125-135] MP 1399	[1983, p.173-182] MP 1698
Modeling of anisotropic electromagnetic reflection from sea	Sea ice piling at Fairway Rock, Bering Strait, Alaska.	Ice forces on model bridge piers. Haynes, F.D., et al, (1983, 11p.) CR 83-19
ice. Golden, K.M., et al, (1980, p.247-294)	Kovaca, A., et al, [1981, p.985-1000] MP 1460	Measurement of ice forces on structures. Sodhi, D.S., et al,
MP 1325	Modeling pressure ridge buildup on the geophysical scale.	(1983, p.139-155) MIP 1641
Experiments on ice ride-up and pile-up. Sodhi, D.S., et al,	Hibler, W.D., III, [1982, p.141-155] MP 1590	Ice action on two cylindrical structures. Kato, K., et al.
[1983, p.266-270] MIP 1627	Experiments on ice ride-up and pile-up. Sodhi, D.S., et al, [1983, p.266-270] MP 1627	[1983, p.159-166] MP 1643
Alaska's Beaufort Sea coast ice ride-up and pile-up features.	On forecasting mesoscale ice dynamics and build-up. Hibler,	Ice forces on a bridge pier, Ottauquechee River, Vermont. Sodhi, D.S., et al, [1983, 6p.] CR 83-32
Kovacs, A., (1983, 51p.) CR 83-09	W.D., III, et al, [1983, p.110-115] MP 1625	Ice action on two cylindrical structures. Kato, K., et al,
Sea ice on the Norton Sound and adjacent Bering Sea coast. Kovacs, A., (1983, p.654-666) MP 1699	Alaska's Beaufort Sea coast ice ride-up and pile-up features. Kovaca, A., 1983, 51p.; CR 83-09	[1984, p.107-112] MIP 1741
Kovacs, A., [1983, p.654-666] MP 1699 Forces associated with ice pile-up and ride-up. Sodhi, D.S.,	Kovaca, A., [1983, 51p.] CR 83-09 Sea ice on the Norton Sound and adjacent Bering Sea coast.	Dependence of crushing specific energy on the aspect ratio
et al, [1984, p.239-262] MP 1887	Kovacs, A., [1983, p.654-666] MP 1699	and the structure velocity. Sodhi, D.S., et al. (1984, p.363-374) MP 1766
Shore ice override and pileup features, Beaufort Sea.	Forces associated with ice pile-up and ride-up. Sodhi, D.S.,	Crushing ice forces on cylindrical structures. Morris, C.B.,
Kovaca, A., (1984, 28p. + map) CR 84-26	et al, [1984, p.239-262] MIP 1887	et al, [1984, p.1-9] MP 1834
Secretary College College Co. et al. 1075 a 435 441 475	Method of detecting voids in rubbled ice. Tucker, W.B., et al, t1984, p.183-188; MP 1772	Preliminary investigation of thermal ice pressures. Cox, G.F.N., 1984, p.221-229 MP 1788
Snow and ice. Colbeck, S.C., et al., [1975, p.435-441, 475-487] MIP 844	Shore ice override and pileup features, Beaufort Ses.	G.F.N., [1984, p.221-229] MIP 1788 Ice block stability. Daly, S.F., [1984, p.544-548]
Misgivings on isostatic imbalance as a mechanism for sea ice	Kovaca, A., [1984, 28p. + map] CR 84-26	MP 1972
cracking. Ackley, S.F., et al, [1976, p.85-94]	Ice plasticity	lee forces on rigid, vertical, cylindrical structures. Sodhi,
MP 1379	Modeling mesoscale ice dynamics. Hibler, W.D., III, et al.	D.S., et al, [1984, 36p.] CR 84-33
Grounded ice along the Alaskan Beaufort Sea coast. Kovacs, A., [1976, 21p.] CR 76-32	[1981, p.1317-1329] MP 1526 Preliminary results of ice modeling in the East Greenland	Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.46-54] MP 1915
Sea ice properties and geometry. Weeks, W.F., [1976,	area. Tucker, W.B., et al., [1981, p.867-878]	Experience with a biaxial ice stress sensor. Cox, G.F.N.,
p.137-171 ₃ MIP 918	MP 1458	[1985, p.252-258] MP 1937
Sea ice conditions in the Arctic. Weeks, W.F., [1976,	Ice dynamics. Hibler, W.D., III, [1984, 52p.]	Sheet ice forces on a conical structure: an experimental study.
p.173-2053 MP 910	M 84-03 Ice pressure	Sodhi, D.S., et al. [1985, p.643-655] MP 1906
Ice and snow at high altitudes. Mellor, M., [1977, 10p.] MP 1121	Ice forces on vertical piles. Nevel, D.B., et al, [1972, p.104-	Instrumentation for an uplifting ice force model. Zabilansky, L.J., 1985, p.1430-1435 ₁ MP 2091
Seasonal variations in apparent sea ice viscosity on the geo-	114 ₁ MP 1024	Ice cover research-present state and future needs. Kerr,
physical scale. Hibler, W.D., III, et al, [1977, p.87-90]	Structures in ice infested water. Assur, A., (1972, p.93-97)	A.D., et al, [1986, p.384-399] MP 2004
MP 900	MP 1016	Impact ice force and pressure: An experimental study with
Review of Ice Physics by P.V. Hobbs. Ackley, S.P., 1977, p.341-342; MP 937	Depth of water-filled crevasses of glaciers. Weertman, J., 1973, p.139-145, MP 1044	urea ice. Sodhi, D.S., et al, [1986, p.569-576] MP 2037
Abnormal internal friction peaks in single-crystal ice. Stall-	Classification and variation of sea ice ridging in the Arctic	Plexural and buckling failure of floating ice sheets against
man, P.E., et al, [1977, 15p.] SR 77-23	basin. Hibler, W.D., III, et al, [1974, p.127-146]	structures. Sodhi, D.S., [1986, p.339-359] MP 2134
Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98] MP 1616	MP 1022 Ice forces on model structures. Zabilansky, L.J., et al,	Ice prevention
Internal properties of the ice sheet at Cape Folger by radio	[1975, p.400-407] MP 863	lce removal from the walls of navigation locks. Franken- stein, G.E., et al, [1976, p.1487-1496] MP 888
echo sounding. Keliher, T.E., et al, [1978, 12p.]	Statistical variations in Arctic sea ice ridging and deformation	Numerical simulation of air bubbler systems. Ashton, G.D.,
CR 78-04	rates. Hibler, W.D., III, [1975, p.J1-J16] MP 850	[1977, p.765-778] NCP 936
Computer modeling of atmospheric ice accretion. Ackley, S.F., et al, [1979, 36p.] CR 79-64	Forces on an ice boom in the Beauharnois Canal. Perham, R.E., et al., [1975, p.397-407] MP 858	Lock wall deicing. Hanamoto, B., [1977, p.7-14] MP 972
Some results from a linear-viscous model of the Arctic ice	Ice forces on simulated structures. Zabilansky, L.J., et al,	lee accumulation on ocean structures. Minsk, L.D., [1977,
cover. Hibler, W.D., III, et al, [1979, p.293-304]	(1975, p.387-396) MP 864	42p.j CR 77-17
MP 1241	Gas inclusions in the Antarctic ice sheet. Gow, A.J., et al.	Numerical simulation of air bubbler systems. Ashton, G.D.,
Overview on the seasonal sea ice zone. Weeks, W.F., et al, [1979, p.320-337] MP 1320	[1975, p.5101-5108] MP 847	(1978, p.231-238) MP 1618
Ice sheet internal reflections. Ackley, S.F., et al., [1979,	Preeze damage prevention in utility distribution lines. McFadden, T., [1977, p.221-231] MP 929	Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-11
p.5675-5680 ₁ MP 1319	Ice forces on vertical piles. Nevel, D.E., et al, [1977, 9p.]	Preezing problems with wintertime wastewater spray irriga-
Crystal alignments in the fast ice of Arctic Alaska. Weeks,	CR 77-10	tion. Bouzoun, J.R., [1979, 12p.] SR 79-12
W.F., et al. [1980, p.1137-1146] MP 1277 Conference on Computer and Physical Modeline in Hydrau-	Freeze damage protection for utility lines. McFadden, T., [1977, p.12-16] MP 953	Deicing a satellite communication antenna. Hanamoto, B.,
Conference on Computer and Physical Modeling in Hydrau- lic Engineering, 1980. Ashton, G.D., ed, (1980, 492p.)	[1977, p.12-16] MP 953 Intermittent ice forces acting on inclined wedges. Tryde, P.,	et al, [1980, 14p.] SR 80-18 Ice adhesion tests on coatings subjected to rain erosion.
MP 1321	(1977, 26p.) CR 77-26	Minak, L.D., (1980, 14p.) SR 80-28
Heat and mass transfer from freely falling drops at low tem-	Ice and ship effects on the St. Marys River ice booms. Per-	Icing on structures. Minsk, L.D., [1980, 18p.]
perstures. Zarling, J.P., (1980, 14p.) CR 80-18	ham, R.E., [1978, p.222-230] MP 1617	CR 80-31
Sea ice: the potential of remote sensing. Weeks, W.F., [1981, p.39-48] MP 1468	Ice cover forces on structures. Kerr, A.D., (1978, p.123- 134) MP 879	Hydraulic model study of a water intake under frazil ice conditions. Tantillo, T.J., [1981, 11p.] CR 81-03
Modeling pressure ridge buildup on the geophysical scale.	Arching of model ice floes at bridge piers. Calkins, D.J.,	River ice suppression by side channel discharge of warm wa-
Hibler, W.D., III, [1982, p.141-155] MP 1590	(1978, p.495-507) MP 1134	ter. Ashton, G.D., [1982, p.65-80] MIP 1528
Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SR 82-28	Horizontal forces exerted by floating ice on structures. Kerr,	Performance of a point source bubbler under thick ice.
	A.D., [1978, 9p.] CR 78-15	Haynes, F.D., et al. (1982, p.111-124) MP 1529

Total managed to the first of t	•	Challend and another the the transfer of
Lake water intakes under icing conditions. Dean, A.M., Jr., [1983, 7p.] CR 83-15	Verbasias reported of such used at construction material	Giaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] MP 1886
How effective are icephobic coatings. Minsk, L.D., [1983,	Mechanical properties of snow used as construction material. Wuori, A.F., [1975, p.157-164] MP 1957	Resurvey of the "Byrd" Station, Antarctica, drill hole. Gar-
p.93-95 ₁ MP 1634	Cantilever beam tests on reinforced ice. Ohstrom, E.G., et	field, D.E., et al, [1976, p.29-34] MP 846
Aerostat icing problems. Hanamoto, B., [1983, 29p.]	ai, [1976, 12p.] CR 76-87	Internal structure and crystal fabrics of the West Antarctic ice
SR 83-23	Surface protection measures for the Arctic Slope, Alaska.	sheet. Gow, A.J., et al, [1976, 25p.] CR 76-35
Ice observation program on the semisubmersible drilling ves- sel SEDCO 708. Minsk, L.D., [1984, 14p.]	Johnson, P.R., [1978, p.202-205] MP 1519	Geodetic positions of borehole sites in Greenland. Mock, S.J., 1976, 7p., CR 76-41
SR 84-62	Snow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] MP 1223	S.J., [1976, 7p.] CR 76-41 Crystal fabrics of West Antarctic ice sheet. Gow, A.J., et al,
Atmospheric icing on sea structures. Makkonen, L., [1984,	Ice thickness-tensile stress relationship for load-bearing ice.	[1976, p.1665-1677] MP 1382
92p. ₁ M 84-02	Johnson, P.R., (1980, 11p.) SR 80-09	Changes in the composition of atmospheric precipitation.
Polyethylene glycol as an ice control coating. Itagaki, K.,	Ice renways	Cragin, J.H., et al, [1977, p.617-631] MP 1079
[[984, 11p.] CR 84-28	Mechanical properties of snow used as construction material.	Atmospheric trace metals and sulfate in the Greenland Ice
Ice push	Wuori, A.P., [1975, p.157-164] MP 1057	Sheet. Herron, M.M., et al, [1977, p.915-920] MP 949
Ice pile-up and ride-up on Arctic and subarctic beaches. Kovaca, A., et al., (1979, p.127-146) MP 1230	The strength of natural and processed snow. Abele, G.,	Internal properties of the ice sheet at Cape Polger by radio
Ice pile-up and ride-up on arctic and subarctic beaches.	[1975, p.176-186] MP 1658 Runway site survey, Pensacola Mountains, Antarctica.	echo sounding. Keliher, T.E., et al, [1978, 12p.]
Kovacs, A., et al, [1981, p.247-273] MP 1538	Kovaca, A., et al. (1977, 45p.) SR 77-14	CR 78-64
Ice rafting	Ice salinity	Creep rupture at depth in a cold ice sheet. Colbeck, S.C., et
Pebble fabric in an ice-rafted diamicton. Domack, E.W., et	Sea ice studies in the Weddell Sea region aboard USCGC	al, [1978, p.733] MP 1168
al, [1985, p.577-591] MP 1959	Burton Island. Ackley, S.P., [1977, p.172-173]	Ultrasonic investigation on ice cores from Antarctica. Kohnen, H., et al, [1979, 16p.] CR 79-16
Ice refrigeration Isua, Greenland: glacier freezing study. Ashton, G.D.,	MP 1014	Extending the useful life of DYE-2 to 1986, Part 1. Tobias-
[1978, p.256-264] MIP 1174	Modeling of anisotropic electromagnetic reflections from sea ice. Golden, K.M., et al, (1981, p.8107-8116;	son, W., et al, [1979, 15p.] SR 79-27
Ice relexation	MP 1469	Ultrasonic investigation on ice cores from Antarctica.
Charged dislocation in ice. 2. Contribution of dielectric	Growth, structure, and properties of sea ice. Weeks, W.F.,	Kohnen, H., et al., [1979, p.4865-4874] MP 1239
relaxation. Itagaki, K., [1982, 15p.] CR 82-07	et al, (1982, 130p.) M 82-01	lce sheet internal reflections. Ackley, S.F., et al, [1979, p.5675-5680] MP 1319
Effect of X-ray irradiation on internal friction and dielectric	Using sea ice to measure vertical heat flux in the ocean.	Ultrasonic tests of Byrd Station ice cores. Gow, A.J., et al.,
relaxation of ice. Itagaki, K., et al, [1983, p.4314-4317] MP 1670	McPhee, M.G., et al, [1982, p.2071-2074] MP 1521 Equations for determining the gas and brine volumes in sea	[1979, p.147-153] MP 1282
Possibility of anomalous relaxation due to the charged dislo-	ice samples. Cox, G.F.N., et al, [1982, 11p.]	Margin of the Greenland ice sheet at Isua. Colbeck, S.C., et
cation process. Itagaki, K., (1983, p.4261-4264)	CR 82-30	al, (1979, p.155-165) MP 1281
MP 1669	McMurdo Ice Shelf brine zone. Kovacs, A., et al, 1982,	Review of buckling analyses of ice sheets. Sodhi, D.S., et al, [1980, p.131-146] MP 1322
Discussion: Electromagnetic properties of sea ice by R.M. Morey, A. Kovacs and G.F.N. Coz. Arcone, S.A., 1984,	28p.) CR 82-39	Some promising trends in ice mechanics. Assur, A., [1980,
p.93-94 ₁ MP 1821	Chemical fractionation of brine in the McMurdo Ice Shelf. Cragin, J.H., et al, [1983, 16p.] & CR 83-06	p.1-15 ₁ MP 1300
Authors' response to discussion on: Electromagnetic proper-	Ice properties in the Greenland and Barents Seas during sum-	Planetary and extraplanetary event records in polar ice caps.
ties of sea ice. Morey, R.M., et al, [1984, p.95-97]	mer. Overgaard, S., et al, [1983, p.142-164]	Zeller, E.J., et al, [1980, p.18-27] MP 1461
MP 1822	MP 2062	Dynamics of snow and ice masses. Colbeck, S.C., ed,
Ice removal Use of explosives in removing ice jams. Frankenstein, G.E.,	Thermal expansion of saline ice. Cox, G.F.N., [1983,	[1980, 468p.] MP 1297
et al, [1970, 10p.] MP 1021	p.425-432 ₁ MP 1768 Horizontal salinity variations in sea ice. Tucker, W.B., et al.	Alaska Good Friday earthquake of 1964. Swinzow, G.K., (1982, 26p.) CR 82-91
Winter maintenance research needs. Minsk, L.D., [1975,	[1984, p.6505-6514] MP 1761	Determining the characteristic length of model ice sheets.
p.36-38 ₁ MP 950	Structure, salinity and density of multi-year sea ice pressure	Sodhi, D.S., et al, [1982, p.99-104] MP 1570
p.36-38 ₁ De-icing using lasers. Lane, J.W., et al, [1976, 25p.] CR 76-10	ridges. Richter-Menge, J.A., et al, [1985, p.194-198]	Ice sheet retention structures. Perham, R.E., [1983, 33p.]
Investigation of water jets for lock wall deicing. Calkins,	MP 1857	Experimental determination of buckling loads of cracked ice
D.J., et al, [1976, p.G2/13-22] MP 865	Dielectric properties at 4.75 GHz of saline ice alabs. Arcone, S.A., et al, [1985, p.83-86] MP 1911	sheets. Sodhi, D.S., et al, [1984, p.183-186]
Ice removal from the walls of navigation locks. Franken-	Ice electrical properties. Gow, A.J., [1985, p.76-82]	MP 1687
stein, G.E., et al. (1976, p.1487-1496) MP 288	MP 1910	Ice sheet retention structures. Perham, R.E., [1984, p.339-
De-icing of radomes and lock walls using pneumatic devices.	Company policies and density of multi-uses are ice managed	348 ₁ MP 1832
Ackley S.F. et al. 1977 n 467-478. MP 1064	Structure, salinity and density of multi-year sea ice pressure	Determining the characteristic length of floating in all outs but
Ackley, S.F., et al, [1977, p.467-478] MP 1064 Lock wall deicing studies. Hanamoto, B., ed. :1977, 68p.;	ridges. Richter-Menge, J.A., et al, [1985, p.493-497]	Determining the characteristic length of floating ice sheets by moving loads. Sodhi, D.S., et al., r1985, p. 155-159;
Ackley, S.F., et al, [1977, p.467-478] MP 1964 Lock wall descing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965	Determining the characteristic length of floating ice sheets by moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1855
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., [1977,	ridges. Richter-Menge, J.A., et al, [1985, p.493-497]	moving loads. Sodhi, D.S., et al, 1985, p. 155-159, MP 1855 Borehole geometry on the Greenland and Antarctic ice
Lock wall descing studies. Hanamoto, B., ed, 1977, 68p.; SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., 1977, 42p.; CR 77-17	ridges. Richter-Menge, J.A., et al, [1985, p.493-497] MP 1965 Ice properties in a grounded man-made ice island. Cox,	moving loads. Sodhi, D.S., et al, [1985, p.155-159, MP 1855 Borehole geometry on the Greenland and Antarctic ice aheets. Jezek, K.C., [1985, p.242-251] MP 1817
Lock wall descing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., [1977, 42p.] Lock wall descine. Hanamoto, B., [1977, p.7-14]	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 lee properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 lee sampling Preparation of polycrystalline ice specimens for laboratory	moving loads. Sodhi, D.S., et al, (1985, p.155-159), MP 1855 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., (1985, p.242-251) MP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al,
Lock wall descing studies. Hanamoto, B., ed, 1977, 68p.; SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., 1977, 42p.; CR 77-17	ridges. Richter-Menge, J.A., et al, 1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox., G.F.N., et al, 1986, p.135-142; MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., 1979, p.153-159;	moving loads. Sodhi, D.S., et al, [1985, p.155-159, MP 1855 Borehole geometry on the Greenland and Antarctic ice aheets. Jezek, K.C., [1985, p.242-251] MP 1817
Lock wall deicing studies. Hanamoto, B., ed, t1977, 68p.; SR 77-22 Ice accumulation on ocean structures. Minak, L.D., t1977, 42p.; CR 77-17 Lock wall deicing. Hanamoto, B., t1977, p.7-14; MP 972 Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al., t1977, p.23-35; MP 973	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox, G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1855 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadluk ice stress messurement program. Johnson, J.B., et al, [1985, p.38-100] MP 1859
Lock wall deicing studies. Hanamoto, B., ed, 1977, 68p.; SR 77-22 Ice accumulation on ocean structures. Minak, L.D., 1977, 42p.; CR 77-17 Lock wall deicing. Hanamoto, B., 1977, p.7-14; MP 972 Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al., 1977, p.23-35; MP 973 Laboratory experiments on lock wall deicing using pneumatic	ridges. Richter-Menge, J.A., et al, 1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox., G.F.N., et al, 1986, p.135-142; MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., 1979, p.153-159;	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadfuk ice stress measurement program. Johnson, J.B., et al, [1985, p.38-100] MP 1899 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1966
Lock wall deicing studies. Hanamoto, B., ed, t1977, 68p.; SR 77-22 Ice accumulation on ocean structures. Minak, L.D., t1977, 42p.; CR 77-17 Lock wall deicing. Hanamoto, B., t1977, p.7-14; MP 972 Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al., t1977, p.23-35; MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al., t1977, p.53-68; MP 974	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 lee properties in a grounded man-made ice island. Cox, G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole,	moving loads. Sodhi, D.S., et al, [1985, p.155-159]. MIP 1855 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MIP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MIP 1996 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Sou Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discon-	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 lee properties in a grounded man-made ice island. Cox, G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska.	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MF 1899 Sheet ice forces on a consical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1966 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1842
Lock wall deicing studies. Hanamoto, B., ed, t1977, 68p.; SR 77-22 Ice accumulation on ocean structures. Minak, L.D., t1977, 42p.; CR 77-17 Lock wall deicing. Hanamoto, B., t1977, p.7-14; MP 972 Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al., t1977, p.23-35; MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al., t1977, p.53-68; MP 974	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 lee properties in a grounded man-made ice island. Cox, G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751	moving loads. Sodhi, D.S., et al, [1985, p.155-159]. MIP 1855 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MIP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MIP 1996 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.53-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., MP 1141	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska, Kovaca, A., [1977, p.15] Istribution and features of bottom sediments in Alaskan	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a comical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1995 Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1942 Snow and ice. Colbock, S.C., et al, [1975, p.435-441, 475- 487] Melting and freezing of a drill hole through the Antarctic shelf
Lock wall deicing studies. Hanamoto, B., ed, 1977, 68p.; SR 77-22 Ice accumulation on ocean structures. Minak, L.D., 1977, 42p.; CR 77-17 Lock wall deicing. Hanamoto, B., 1977, p.7-14; MP 972 Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, 1977, p.23-35; MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, 1977, p.33-68; MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, 1978, 10p.; CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, 1978, p.544-551; MP 1141 Current research on snow and ice removal in the United	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 lee properties in a grounded man-made ice island. Cox, G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MP 1899 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1966 Ice sherves Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] MF 244 Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 264
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Lor releasing block-copolymer coatings. Jellinek, H.R. of MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coestal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1855 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1917 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MP 1999 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1996 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] Glaciology's grand unsolved problem. Weertman, J.,
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Lor releasing block-copolymer coatings. Jellinek, H.R. of MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 lee properties in a grounded man-made ice island. Cox, G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.38-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475- 487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 861 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Lor releasing block-copolymer coatings. Jellinek, H.R. 6.08 Later tresearch on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1191 Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D.,	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751 Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981,	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1855 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1917 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MP 1999 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1996 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] Glaciology's grand unsolved problem. Weertman, J.,
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] MP 972 Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinsk, H.H.G., et al, [1978, p.31-22] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 33p.) SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) CR 79-12	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovacs, A., et al, [1981, p.125-135]	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.38-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Ites shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] MF 1944 Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 261 Glaciology's grand unsolved problem. Weertman, J., [1976, p.244-256] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977,
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] Ice releasing block-copolymer costings. Jellinek, H.H. (2008) MP 1141 Current research on sanow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 33p.] Seeking low ice adhesion. Sayward, J.M., [1979, 33p.] Freezing and thawing tests of liquid deicing chemicals on	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751 Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981,	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1837 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-635] MP 1995 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1996 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MP 864 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.495-351]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] MP 972 Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinsk, H.H.G., et al, [1978, p.31-22] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 33p.) SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) CR 79-12	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] MP 1599 Subses trenching in the Arctic. Mellor, M., [1981, 31p., CR 81-17] Ice scoring on the Alaskan shelf of the Beaufort Ses. Weeks,	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1837 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-635] MP 1995 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1996 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MP 864 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.495-351]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.34-551] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-11 Priesing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 lee properties in a grounded man-made ice island. Cox, G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map) CR 83-21	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.38-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Ites shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] MF 1944 Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 261 Glaciology's grand unsolved problem. Weertman, J., [1976, p.244-256] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977,
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.344-551] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., [1979, p.31-38] Point source bubbler systems to suppress ice. Ashton, G.D., [1979, p.93-100) MP 1326	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Istribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 49. + map) Some probabilistic aspects of ice gouging on the Alaskan Shelf	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a comical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Show and ice. Colbeck, S.C., et al, [1975, p.159] MF 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] MP 1042 Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] Glaciology's grand unolved problem. [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo
Lock wall deicing studies. Hanamoto, B., ed, £1977, 68p.; SR 77-22 Ice accumulation on ocean structures. Minak, L.D., £1977, 42p.; CR 77-17 Lock wall deicing. Hanamoto, B., £1977, p.7-14; MP 972 Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, £1977, p.23-35; MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, £1977, p.53-68; MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, £1978, 10p.; CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, £1978, p.31-22; MP 1149 Seeking low ice adhesion. Sayward, J.M., £1979, \$3p.; SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., £1979, £12p.; Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., £1979, p.51-58; MP 1220 Point source bubbler systems to suppress ice. Ashton, G.D., MF 1326 Clearing ice-clogged shipping channels. Vance, G.P.,	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map] CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.86-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1995 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1996 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Mclting and freezing of a drill hole through the Antarctic shelf ice. Tion, C., et al, [1975, p.421-432] MP 864 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.495-351] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctics. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf at Little America V, antarctica. User and the stable of the Ross Ice Shelf at Little America V, Antarctics. Danagaard, W., et al, [1977, p.146-1449]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.344-551] Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] MP 1141 Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-38) Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) CR 39-12 Clearing ice-clogged shipping channels. Vance, G.P., CR 80-28	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subasa trenching in the Arctic. Mellor, M., [1981, 31p., CR 81-17] Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map] Some probabilistic sspectu of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, 19838	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MR 1899 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1966 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 864 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovacs, A., et al, [1977, p.16-145] MF 1813
Lock wall deicing studies. Hanamoto, B., ed, £1977, 68p.; SR 77-22 Ice accumulation on ocean structures. Minak, L.D., £1977, 42p.; CR 77-17 Lock wall deicing. Hanamoto, B., £1977, p.7-14; MP 972 Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, £1977, p.23-35; MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, £1977, p.53-68; MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, £1978, 10p.; CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, £1978, p.31-22; MP 1149 Seeking low ice adhesion. Sayward, J.M., £1979, \$3p.; SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., £1979, £12p.; Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., £1979, p.51-58; MP 1220 Point source bubbler systems to suppress ice. Ashton, G.D., MF 1326 Clearing ice-clogged shipping channels. Vance, G.P.,	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] CR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] MP 1599 Subses trenching in the Arctic. Mellor, M., [1981, 31p., CR 81-17] Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-226] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.217-378]	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.86-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1995 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1996 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Mclting and freezing of a drill hole through the Antarctic shelf ice. Tion, C., et al, [1975, p.421-432] MP 864 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.495-351] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctics. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf at Little America V, antarctica. User and the stable of the Ross Ice Shelf at Little America V, Antarctics. Danagaard, W., et al, [1977, p.146-1449]
Lock wall descing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., [1977, 42p.] Lock wall descing. Hanamoto, B., [1977, p.7-14] Lock wall descing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall descing using pneumatic devices. Itagaki, K., et al, [1977, p.53-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.544-551] MP 1141 Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., [1979, 12p.] Point source bubbler systems to suppress ice. Ashton, G.D., [1979, p.93-100] CR 99-12 Point source bubbler systems to suppress ice. Ashton, G.D., [1979, p.93-100] CR 99-12 CR 90-18 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., [1983, p.1-5] MP 1219 Mechanical ice release from high-speed rotors. Itagaki, K.,	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sempling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 89-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map) CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.371-378] MP 1743 Study of sea ice induced gouges in the sea floor. Weeks,	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a comical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-331] Stable isotope profile through the Ross Ice Shelf at Little America V. Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovacs, A., et al, [1977, p.146-148] MF 1613 Ross Ice Shelf Project drilling, October-December 1976, Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.C., al, [1978, p.34-4551] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 33p.) SR 79-11 Proexing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) Clearing ice-clogged shipping channels. Vance, G.P., (1980, 13p.) CR 83-28 SR 79-12 MP 1326 Vance, G.P., (1980, 13p.) MP 1326 CR 83-28	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, p.] MP 1751 Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 89-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] MP 1599 Subaca trenching in the Arctic. Mellor, M., [1981, 31p., C.R. 81-17] Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map] CR 83-21 Some probabilistic sspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.126-135] MP 1917	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.38-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] MP 1042 Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MCP 661 Glaciology's grand unsolved problem. Weertman, J., [1976, p.244-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.146-149] Ross Ice Shelf Project drilling, October-December 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.146-149] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.146-149]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Lor releasing block-copolymer costings. Jellinek, H.H.G., et al, [1978, p.34-551] Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1191 Seeking low ice adhesion. Sayward, J.M., [1979, 83p.) SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Presting and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-59] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.39-100) Clearing ice-clogged shipping channels. Vance, G.P., (1980, 13p.) Clearing ice-clogged shipping channels. Vance, G.P., (298-28) Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, 8p.) Strategies for winter maintenance of pavements and road-	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Istribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.371-378] Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.126-135] NMP 1917 Numerical simulation of sea ice induced gouges on the shelves of the polar occass. Weeks, W.F., et al, [1985, p.259-	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MP 1899 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1966 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MP 844 Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-236] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Ragineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.146-148], MP 1013 Ross Ice Shelf Project drilling, October-December 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, MP 1061]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.C., al, [1978, p.34-4551] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 33p.) SR 79-11 Proexing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) Clearing ice-clogged shipping channels. Vance, G.P., (1980, 13p.) CR 83-28 SR 79-12 MP 1326 Vance, G.P., (1980, 13p.) MP 1326 CR 83-28	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] MP 1599 Subses trenching in the Arctic. Mellor, M., [1981, 31p., CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Ses. Weeks, W.F., et al, [1983, 34p. + map] Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Ses. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] NMP 1743 Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.126-135] MP 1917 Numerical simulation of sea ice induced gouges on the shelves of the polar oceans. Weeks, W.F., et al, [1985, p.259-265] MP 1938	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.38-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] MP 1042 Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MCP 661 Glaciology's grand unsolved problem. Weertman, J., [1976, p.244-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.146-149] Ross Ice Shelf Project drilling, October-December 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.146-149] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.146-149]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.344-551] MP 1141 Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 83p.) SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Prezzing and thawing tests of liquid deicing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-58) Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) CR 79-12 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, p.1-6) MP 1719 Mechanical ice release from high-speed rotors. Itagaki, K., (1983, 8p.) Strategies for winter maintenance of pavements and roadways. Minsk, L.D., et al, [1984, p.155-167] MP 1964 Snow and ice prevention in the United States. Minsk, L.D.,	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751 Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map) CR 83-21 Some probabilistic aspects of ice gousing on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1985, p.126-135] Numerical simulation of sea ice induced gouges on the shelves of the polar oceans. Weeks, W.F., et al, [1985, p.259-265] MP 1938 Ice gouge formation and infilling, Beaufort Sea. Weeks,	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MF 1899 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1966 Snow and ice. Colbeck, S.C., et al, [1975, p.159] MF 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.159, MF 1946 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 1966 Glaciology's grand unsolved problem. Weertman, J., (1976, p.284-286) Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Bngineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.160-185] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.137-138] Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98) Ross Ice Shelf Project environmental impact statement July,
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.34-4551] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 33p.) SR 79-11 Proexing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) MP 1326 Clearing ice-clogged shipping channels. Vance, G.P., (1983, p.1-6) MP 1326 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167)	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sempling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, 31p., 125-135] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map] CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1985, p.219-125-135] NMP 1933 Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.216-135] NMP 1917 Numerical simulation of sea ice induced gouges on the shelves of the polar oceans. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265]	moving loads. Sodhi, D.S., et al., [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al., [1985, p.88-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al., [1985, p.643-655] Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1042 Snow and ice. Colbeck, S.C., et al., [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al., [1975, p.421-432] Glaciology'a grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al., [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al., [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf at Little America V, Antarctica. Kovacs, A., et al., [1977, p.146-148] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al., [1977, p.137-138] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.45-98] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.45-98] MF 1678 NP 1678
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.34-4551] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 33p.) SR 79-11 Proexing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) MP 1326 Clearing ice-clogged shipping channels. Vance, G.P., (1983, p.1-6) MP 1326 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167)	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sempling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, 31p., 125-135] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map] CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1985, p.219-125-135] NMP 1933 Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.216-135] NMP 1917 Numerical simulation of sea ice induced gouges on the shelves of the polar oceans. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265]	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MP 1899 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1966 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MP 644 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-236] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-235] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.146-148] Ross Ice Shelf Project drilling, October-Docember 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.137-138] Ross Ice Shelf Project drilling, October-Docember 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.137-138] NP 1011 Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98] NP 1616 Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] NP 1057.
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.34-4551] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 33p.) SR 79-11 Proexing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) MP 1326 Clearing ice-clogged shipping channels. Vance, G.P., (1983, p.1-6) MP 1326 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167)	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sempling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, 31p., 125-135] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map] CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1985, p.219-125-135] NMP 1933 Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.216-135] NMP 1917 Numerical simulation of sea ice induced gouges on the shelves of the polar oceans. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265]	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a comical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1995 Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 661 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.16-185] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.137-138] Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98] Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] MF 1678 Core drilling through Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.65-64]
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 974 Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.34-4551] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 33p.) SR 79-11 Proexing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) MP 1326 Clearing ice-clogged shipping channels. Vance, G.P., (1983, p.1-6) MP 1326 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167) Mechanical ice release from high-speed rotors. Itagaki, K., (1984, p.155-167)	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751 Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p., CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map) CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.216-135] NP 1938 Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-66] Ice sheets Oxygen isotope profiles through ice sheets. Johnsen, S.J., et	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MP 1899 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1966 Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MP 644 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-236] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-235] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.146-148] Ross Ice Shelf Project drilling, October-Docember 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.137-138] Ross Ice Shelf Project drilling, October-Docember 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1977, p.137-138] NP 1011 Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98] NP 1616 Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] NP 1057.
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.344-551] Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.12p.) Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) (1979, p.93-100) Clearing ice-clogged shipping channels. Vance, G.P., (1983, 8p.) Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, 8p.) Strategies for winter maintenance of pavements and roadways. Minak, L.D., et al, [1984, p.155-167] MP 1964 Snow and ice prevention in the United States. Minak, L.D., (1986, p.37-42) Conductor twisting resistance effects on ice build-up and ice shedding. Govoni, J.W., et al, (1986, 8p. + figs.) MP 2108 Meso-scale strain measurements on the Beaufourt sea pack	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice seephing Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 89-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 89-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, 31p., 125-135] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map) CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice sheets Oxygem isotope profiles through ice sheets. Johnsen, S.J., et al, [1972, p.429-434]	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a comical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] Ice shelves Stability of Antarctic ice. Weertman, J., [1975, p.159] MF 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 159.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-331] Stable isotope profile through the Ross Ice Shelf at Little America V. Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf McMurdo Sound, Antarctica. Kovacs, A., et al, [1977, p.146-148] NP 1013 Ross Ice Shelf Project drilling. October-December 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al, [1977, p.137-138] Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98] Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] Antifreeze-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.169-118] Dynamics of snow and ice masses. Colbeck, S.C., ed,
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer costings. Jellinek, H.H. et al, [1978, p.53-68] MP 1141 Current research on anow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 83p.) SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Print source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Preezing and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Protein source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Self-shedding of accreted ice from high-speed rotors. Itaga-ki, K., (1983, 8p.) Strategies for winter maintenance of pavements and roadways. Minak, L.D., et al, [1984, p.155-167] MP 1964 Snow and ice prevention in the United States. Minak, L.D., (1980, p.37-42) Conductor twisting resistance effects on ice build-up and ice shedding. Govoni, J.W., et al, (1986, 8p. + figs.) MP 2108 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971). Hibler, W.D., III, et al, [1974,	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p., CR 81-17] Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map] Some probabilistic sspectu of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.126-135] NP 1938 Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice gouge hazard analysis. Lanan, G.A., et al, [1986, p.57-66] Surface-wave dispersion in Byrd Land. Acharys, H.K.,	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.86-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1996 Steet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1996 Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1996 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Mclting and freezing of a drill hole through the Antarctic shelf ice. Tion, C., et al, [1975, p.421-432] MP 864 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-351] Stable isotope profile through the Ross Ice Shelf Project drilling. October-December 1976. Ross Ice Shelf Project drilling. October-December 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al, [1977, p.137-138] Some elements of iceberg technology. Weeks, W.F., et al, [1977, p.137-138] Ross Ice Shelf Project drilling. October-December 1976 Core drilling through Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., [1979, p.63-64] Antifreez-
Lock wall descing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., [1977, 42p.] Lock wall descing. Hanamoto, B., [1977, p.7-14] Lock wall descing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973 Laboratory experiments on lock wall descing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.344-551] Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] MP 1141 Current research on snow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Preezing and thawing tests of liquid descing chemicals on selected pavement materials. Minsk, L.D., [1979, p.51-58] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) Clearing ice-clogged shipping channels. Vance, G.P., (1980, 13p.) CR 80-28 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, p.1-6) MP 1719 Mechanical ice release from high-speed rotors. Itagaki, K., (1983, p.1-6) Strategies for winter maintenance of pavements and roadways. Minsk, L.D., et al, [1984, p.155-167] MP 1964 Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) Conductor twisting resistance effects on ice build-up and ice shedding. Govoni, J.W., et al, [1986, 8p. + figs.) MP 2108 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971). Hibler, W.D., III, et al, [1974, p.119-138]	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751 Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map) CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] MP 1838 Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] MP 1838 Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice sheets Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al, [1972, p.429-434] Surface-wave dispersion in Byrd Land. Acharya, I.K. (1977, p.535-959)	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MF 1899 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1966 Sodhi, D.S., et al, [1985, p.643-655] MF 1966 Snow and ice. Colbeck, S.C., et al, [1975, p.159] MF 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 2066 Glaciology's grand unsolved problem. Weertman, J., (1976, p.284-286) Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Ragineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.146-148] Ross Ice Shelf Project drilling. October-Docember 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1978, p.45-98] Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] RP 1061 Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] Antifreeze-thermodrilling, central Ross Ice Shelf. Zottkov, I.A., et al, [1979, p.36-64] Antifreeze-thermodrilling, central Ross Ice Shelf. Zottkov, I.A., et al, [1979, p.36-64] Rand detection of sea ice and current alinement under the
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.33-55] MP 973 Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-65] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.544-551] MP 1141 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., [1979, 12p.] Presting and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-35] Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) (1979, p.93-100) CR 99-12 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, p.1-6) MP 1326 Snow and ice prevention in the United States. Minak, L.D., [1983, p.7-42] Conductor twisting resistance effects on ice build-up and ice shedding. Govoni, J.W., et al, [1986, 8p. + figs.] MP 1035 Mesurement of measurements on the Beaufourt sea pack ice (AIDJEX 1971). Hibler, W.D., III, et al, [1974, p.119-138] Mesurement of measurements on the Beaufourt sea pack ice (AIDJEX 1971). Hibler, W.D., III, et al, [1974, p.119-138] Mesurement of measurements on the Beaufourt sea ice (AIDJEX 1971). Hibler, W.D., III, et al, [1974, p.119-138]	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p., CR 81-17] Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map] Some probabilistic sspectu of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Study of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.126-135] NP 1938 Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice gouge hazard analysis. Lanan, G.A., et al, [1986, p.57-66] Surface-wave dispersion in Byrd Land. Acharys, H.K.,	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.86-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1996 Steet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1996 Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1996 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Mclting and freezing of a drill hole through the Antarctic shelf ice. Tion, C., et al, [1975, p.421-432] MP 864 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-351] Stable isotope profile through the Ross Ice Shelf Project drilling. October-December 1976. Ross Ice Shelf Project drilling. October-December 1976. Rand, J.H., [1977, p.150-152] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al, [1977, p.137-138] Some elements of iceberg technology. Weeks, W.F., et al, [1977, p.137-138] Ross Ice Shelf Project drilling. October-December 1976 Core drilling through Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., [1979, p.63-64] Antifreez-thermodrilling, central Ross Ice Shelf. Zotikov, I.A., [1979, p.63-64] Antifreez-
Lock wall descing studies. Hanamoto, B., ed, (1977, 68p.) SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., (1977, 42p.) Lock wall descing. Hanamoto, B., (1977, p.7-14) Lock wall descing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, (1977, p.23-35) MP 973 Laboratory experiments on lock wall descing using pneumatic devices. Itagaki, K., et al, (1977, p.33-68) Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, (1978, 10p.) Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, (1978, p.344-551) Current research on snow and ice removal in the United States. Minsk, L.D., (1978, p.21-22) MP 1141 Current research on snow and ice removal in the United States. Minsk, L.D., (1978, p.21-22) Foint source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Presting and thawing tests of liquid descing chemicals on selected pavement materials. Minsk, L.D., (1979, p.51-58) Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) Clearing ice-clogged shipping channels. Vance, G.P., (1980, 13p.) CR 80-28 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, p.1-6) MP 1326 Snow and ice prevention in the United States. Minsk, L.D., (1983, 8p.) Strategies for winter maintenance of pavements and roadways. Minsk, L.D., et al, (1984, p.155-167) MP 1974 Conductor twisting resistance effects on ice build-up and ice shedding. Govoni, J.W., et al, (1986, 8p. + figs.) MP 2108 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971). Hibler, W.D., III, et al, (1974, p.119-138) Measurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971). Hibler, W.D., III, et al, (1974, p.143-172)	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice seephing Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751 Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map) CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-2365] Ice gouge formation and infilling, Beaufort Sea. Meeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Meeks, W.F., et al, [1985, p.259-265] Ice sheets Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al, [1972, p.429-434] Snow and ice. Colbeck, S.C., et al, [1975, p.159] MP 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Show and ice. Colbeck, S.C., et al, [1975, p.159] MP 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 244 Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] Glaciology's grand unsolved problem. Weertman, J., (1976, p.284-286) Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15-p.] Bngineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.165-185] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1978, p.45-98] Ross Ice Shelf Project drilling, October-Docember 1976. Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] Amp 1613 Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] Amp 1679, 129-1 Dynamics of snow and ice masses. Colbeck, S.C., ed, (1980, 468p.) Radar detection of sea ice and current alinement under the Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-97] MF 1635 Brine zone in the McMurdo Ice Shelf, Antarctica. Kovaca, A. et al, [1979, 196-97] Properties of snow and ice masses. Colbeck, S.C., ed, (1980, 468p.)
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-22 Ice accumulation on ocean structures. Minak, L.D., [1977, 42p.] Lock wall deicing. Hanamoto, B., [1977, p.7-14] Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al, [1977, p.33-68] Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Ice releasing block-copolymer coatings. Bellinek, H.H. 20, [1978, p.54-55] MP 1191 Current research on snow and ice removal in the United States. Minak, L.D., [1978, p.21-22] MP 1199 Seeking low ice adhesion. Sayward, J.M., [1979, 83p.] SR 79-11 Point source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Presting and thawing tests of liquid deicing chemicals on selected pavement materials. Minak, L.D., [1979, p.51-58] Protonit source bubbler systems to suppress ice. Ashton, G.D., (1979, 13p.) Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, 8p.) CR 89-28 Strategies for winter maintenance of pavements and roadways. Minak, L.D., et al, [1984, p.155-167] MP 1964 Snow and ice prevention in the United States. Minak, L.D., (1986, p.37-42) Conductor twisting resistance effects on ice build-up and ice shedding. Govoni, J.W., et al, (1986, 8p. + figs.) MP 1974 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971). Hibler, W.D., III, et al, (1978, p.148-172) MP 1179 Ice resistivity	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice sampling Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Sudy of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.126-135] NMP 1938 Sudy of sea ice induced gouges in the sea floor. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1972, p.495-434] In P. 1994 Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1972, p.435-437] In P. 1994 Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1972, p.435-437] In P. 1994 Ice gouge formation and infilling, Beaufort Sea. Weeks, W.F., et al, [1972, p.435-437] In P. 1995 Subbility of Antarctic ice. Weerman, J., [1975, p.435-441, 475-447] In P. 1994 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-447]	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MP 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MP 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.86-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1996 Steet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MP 1996 Stability of Antarctic ice. Weertman, J., [1975, p.159] MP 1996 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Mclting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MP 864 Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, p.284-286] Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, p.499-351] Stable isotope profile through the Ross Ice Shelf Yen, YC., et al, [1976, antarctics. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.146-149, Sound, Antarctica. Kovaca, A., et al, [1977, p.137-138] Some elements of iceberg technology. Weeks, McMurdo leyers in the McMurdo lee Shelf. Kovaca, A., et al, [1977, p.137-138] Core drilling through Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifecez-thermodrilling, central Ross Ice Shelf. MP 1615 Core drilling through Ross Ice Shelf. Zotikov, I.A., et al, [1979, p.63-64] Antifecez-thermodrilling, central Ross Ice Shelf. MP 1897 Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-87] Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-87] Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-87] Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-87] Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-87] Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-87] Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-87] Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-87] Ross Ice Sh
Lock wall descing studies. Hanamoto, B., ed, (1977, 68p.) SR 77-22 Ice accumulation on ocean structures. Minsk, L.D., (1977, 42p.) Lock wall descing. Hanamoto, B., (1977, p.7-14) Lock wall descing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, (1977, p.23-35) MP 973 Laboratory experiments on lock wall descing using pneumatic devices. Itagaki, K., et al, (1977, p.33-68) Interaction of a surface wave with a dielectric slab discontinuity. Arcone, S.A., et al, (1978, 10p.) Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, (1978, p.344-551) Current research on snow and ice removal in the United States. Minsk, L.D., (1978, p.21-22) MP 1141 Current research on snow and ice removal in the United States. Minsk, L.D., (1978, p.21-22) Foint source bubbler systems to suppress ice. Ashton, G.D., (1979, 12p.) Presting and thawing tests of liquid descing chemicals on selected pavement materials. Minsk, L.D., (1979, p.51-58) Point source bubbler systems to suppress ice. Ashton, G.D., (1979, p.93-100) Clearing ice-clogged shipping channels. Vance, G.P., (1980, 13p.) CR 80-28 Self-shedding of accreted ice from high-speed rotors. Itagaki, K., (1983, p.1-6) MP 1326 Snow and ice prevention in the United States. Minsk, L.D., (1983, 8p.) Strategies for winter maintenance of pavements and roadways. Minsk, L.D., et al, (1984, p.155-167) MP 1974 Conductor twisting resistance effects on ice build-up and ice shedding. Govoni, J.W., et al, (1986, 8p. + figs.) MP 2108 Meso-scale strain measurements on the Beaufourt sea pack ice (AIDJEX 1971). Hibler, W.D., III, et al, (1974, p.119-138) Measurement of mesoscale deformation of Beaufort sea ice (AIDJEX-1971). Hibler, W.D., III, et al, (1974, p.143-172)	ridges. Richter-Menge, J.A., et al, [1985, p.493-497, MP 1965 Ice properties in a grounded man-made ice island. Cox. G.F.N., et al, [1986, p.135-142] MP 2032 Ice seephing Preparation of polycrystalline ice specimens for laboratory experiments. Cole, D.M., [1979, p.153-159] MP 1327 System for mounting end caps on ice specimens. Cole, D.M., et al, [1985, p.362-365] MP 2016 Ice scoring Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751 Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.] SR 80-15 Sediment displacement in the Ottauquechee River—1975-1978. Martinson, C.R., [1980, 14p.] SR 80-20 Dynamics of near-shore ice. Kovaca, A., et al, [1981, p.125-135] Subsea trenching in the Arctic. Mellor, M., [1981, 31p.] CR 81-17 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks, W.F., et al, [1983, 34p. + map) CR 83-21 Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-236] Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.213-2365] Ice gouge formation and infilling, Beaufort Sea. Meeks, W.F., et al, [1985, p.259-265] Ice gouge formation and infilling, Beaufort Sea. Meeks, W.F., et al, [1985, p.259-265] Ice sheets Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al, [1972, p.429-434] Snow and ice. Colbeck, S.C., et al, [1975, p.159] MP 1042 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-	moving loads. Sodhi, D.S., et al, [1985, p.155-159] MF 1835 Borehole geometry on the Greenland and Antarctic ice sheets. Jezek, K.C., [1985, p.242-251] MF 1817 Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.643-655] MF 1996 Show and ice. Colbeck, S.C., et al, [1975, p.159] MP 1942 Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] MF 244 Melting and freezing of a drill hole through the Antarctic shelf ice. Tien, C., et al, [1975, p.421-432] Glaciology's grand unsolved problem. Weertman, J., (1976, p.284-286) Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15-p.] Bngineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] Stable isotope profile through the Ross Ice Shelf at Little America V, Antarctica. Danagaard, W., et al, [1977, p.322-325] Subsurface measurements of the Ross Ice Shelf, McMurdo Sound, Antarctica. Kovaca, A., et al, [1977, p.165-185] Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovaca, A., et al, [1978, p.45-98] Ross Ice Shelf Project drilling, October-Docember 1976. Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] Amp 1613 Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] Amp 1679, 129-1 Dynamics of snow and ice masses. Colbeck, S.C., ed, (1980, 468p.) Radar detection of sea ice and current alinement under the Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-97] MF 1635 Brine zone in the McMurdo Ice Shelf, Antarctica. Kovaca, A. et al, [1979, 196-97] Properties of snow and ice masses. Colbeck, S.C., ed, (1980, 468p.)

Ice shelves (cont.) Chemical fractionation of brine in the McMurdo Ice Shelf:	Bearing capacity of river ice for vehicles. Nevel, D.E., [1978, 22p.] CR 78-03	Propulsion tests in level ice on a model of a 140-ft WTGB icebreaker. Tatinclaux, J.C., 1985, 13p., CR 85-64
Cragin, J.H., et al, [1983, 16p.] CR 83-66	Buckling pressure of an elastic floating plate. Takagi, S.,	Pressure ridge strength in the Beaufort Sea. Weeks, W.F.,
Changes in the Ross Ice Shelf dynamic condition. Jezek, K.C., (1984, p.409-416) MP 2668	(1978, 49p.) CR 78-14 Rheology of ice. Fish, A.M., (1978, 196p.) MP 1988	[1985, p.167-172] MIP 2121 Experience with a biaxial ice stress sensor. Cox, G.F.N.,
Modified theory of bottom crevases. Jezek, K.C., 1984,	Horizontal forces exerted by floating ice on structures. Kerr,	£1985, p.252-258 ₁ MP 1937
p. 1925-1931; MP 2059 Mass balance of a portion of the Ross Ice Shelf. Jezek, K.C.,	A.D., [1978, 9p.] CR 78-15 Effect of temperature on the strength of snow-ice. Haynes,	Compressive strength of multi-year sea ice. Kovacs, A., [1985, p.116-127] MP 1901
et al, [1984, p.381-384] MP 1919	F.D., (1978, 25p.) CR 78-27	lce island fragment in Stefansson Sound, Aleska. Kovaca,
Rheology of glacier ice. Jezek, K.C., et al, 1985, p.1335- 1337; MP 1844	Polycrystalline ice mechanics. Hooke, R.L., et al, 1979, 16p.; MP 1297	A., [1985, p.101-115] MP 1900 Grain size and the compressive strength u. ice. Cole, D.M.,
Numerical simulation of sea ice induced gouses on the shelves	Ice forces on the Yukon River bridge—1978 breakup. John-	(1985, p.369-374) MP 1987
of the polar occans. Weeks, W.F., et al, (1985, p.259- 265) MP 1938	son, P.R., et al, [1979, 40p.] MP 1304	Tensile strength of multi-year pressure ridge sea ice samples. Cox, G.F.N., et al, [1985, p.375-380] MP 1988
Structure of ice in the central part of the Ross Ice Shelf,	Safe ice loads computed with a pocket calculator. Nevel, D.E., [1979, p.205-223] MP 1249	Mechanical properties of multi-year ses ice. Phase 2: Test
Antarctica. Zotikov, I.A., et al, [1985, p.39-44] MIP 2116	Application of the Andrade equation to creep data for ice and	results. Cox, G.F.N., et al., [1985, 81p.] CR 85-16
Ice solid interface	frozen soil. Ting, J.M., et al, [1979, p.29-36] MP 1802	Confined compressive strength of multi-year pressure ridge ses ice samples. Cox, G.F.N., et al, [1986, p.365-373]
Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al, [1977, p.129-136] MP 923	Temperature effect on the uniaxial strength of ice. Haynes, F.D., [1979, p.667-681] MP 1231	MP 2035 Flexural and buckling failure of floating ice sheets against
Seeking low ice adhesion. Sayward, J.M., [1979, 83p.]	Physical properties of sea ice and under-ice current orienta-	structures. Sodhi, D.S., [1986, p.339-359] MP 2134
Working group on ice forces on structures. Carstens, T., ed,	tion. Kovacs, A., et al., (1980, p.109-153) MP 1323	Fracture toughness of model ice. Dempsey, J.P., et al., [1986, p.365-376] MIP 2125
[1980, [46p.] SR 80-26	Review of buckling analyses of ice sheets. Sodhi, D.S., et al., [1980, p.131-146] MP 1322	Ice structure
Dynamic ico-structure interaction analysis for narrow vertical structures. Eranti, E., et al, [1981, p.472-479]	Mechanical properties of polycrystalline ice. Mellor, M., [1980, p.217-245] MP 1302	Report on ice fall from clear sky in Georgia October 26, 1959. Harrison, L.P., et al., (1960, 31p. plus photographs)
MP 1456	Sea ice growth, drift, and decay. Hibler, W.D., III, [1980,	MP 1017
Frost susceptibility of soil; review of index tests. Chamber- lain, B.J., [1981, 110p.] M 81-92	p.141-209 ₁ MIP 1296	Investigation of ice islands in Babbage Bight. Kovacs, A., et al., [1971, 46 leaves] MP 1381
Frost susceptibility of soil; review of index tests. Chamber-	Sea ice anisotropy, electromagnetic properties and strength. Kovacs, A., et al, [1980, 18p.] CR 80-20	Classification and variation of ses ice ridging in the Arctic
lain, E.J., [1982, 110p.] MP 1557 Dynamic ice-structure interaction during continuous crush-	Cyclic loading and fatigue in ice. Mellor, M., et al, [1981,	basin. Hibler, W.D., III, et al, [1974, p.127-146] MP 1022
ing. Määttänen, M., [1983, 48p.] CR 83-05	p.41-53 ₁ MP 1371 Modeling pressure ridge buildup on the geophysical scale.	Results of the US contribution to the Joint US/USSR Bering
Adhesion of ice to polymers and other surfaces. Itagaki, K., [1983, p.241-252] MP 1580	Hibler, W.D., III, [1982, p.141-155] MIP 1590	Ses Experiment. Campbell, W.J., et al, [1974, 197p.] MIP 1032
Method for determining ice loads on offshore structures.	Deformation and failure of frozen soils and ice due to stresses. Fish, A.M., [1982, p.419-428] MP 1553	Some characteristics of grounded floebergs near Prudhoe Bay,
Johnson, J.B., (1983, p.124-128) MP 2056 Experiments on ice ride-up and pile-up. Sodhi, D.S., et al,	Determining the characteristic length of model ice sheets.	Alaska. Kovaca, A., et al, [1976, p.169-172] MIP 1118
[1983, p.266-270] MP 1627	Sodhi, D.S., et al, [1982, p.99-104] MP 1570 Adhesion of ice to polymers and other surfaces. Itagaki, K.,	Grounded floebergs near Prudhoe Bay, Alaska. Kovacs, A.,
On forecasting mesoscale ice dynamics and build-up. Hibler, W.D., III, et al, (1983, p.110-115) MP 1625	[1983, p.241-252] MP 1589	et al, [1976, 10p.] CR 76-34 Internal structure and crystal fabrics of the West Antarctic ice
Buckling loads of floating ice on structures. Sodhi, D.S., et	Properties of urea-doped ice in the CRREL test basin. Hirayama, K., [1983, 44p.] CR 83-68	shoet. Gow, A.J., et al, [1976, 25p.] CR 76-35
al, (1983, p.260-265) MP 1626 Ice forces on model marine structures. Haynes, F.D., et al,	Study on the tensile strength of ice as a function of grain size.	Structural growth of lake ice. Gow, A.J., et al, [1977, 24p.] CR 77-01
[1983, p.778-787] MP 1606	Currier, J.H., et al. [1983, 38p.] CR 83-14 Properties of sea ice in the coastal sones of the polar oceans.	Engineering properties of sea ice. Schwarz, J., et al, [1977,
Implications of surface energy in ice adhesion. Itagaki, K., (1983, p.41-48) MP 1672	Wecks, W.F., et al, [1983, p.25-41] MP 1604	p.499-531 ₁ MP 1065 Compressive and shear strengths of fragmented ice covers.
Ice forces on model bridge piers. Haynes, F.D., et al, (1983,	Mechanical behavior of sea icc. Mellor, M., [1983, 105p.] M 83-1	Cheng, S.T., et al, [1977, 82p.] MIP 951
11p. ₁ CR 83-19 Ice action on two cylindrical structures. Kato, K., et al,	How effective are icephobic coatings. Minsk, L.D., [1983,	Dynamics of near-shore ice. Kovacs, A., et al, r1977, p.411-4241 MIP 1076
[1983, p.159-166] MP 1643	p.93-95; MP 1634 Characteristics of multi-year pressure ridges. Kovacs, A.,	Internal structure of fast ice near Narwahl Island. Gow, A.J.,
Experimental determination of buckling loads of cracked ice sheets. Sodhi, D.S., et al, (1984, p.183-186)	(1983, p.173-182) MP 1698	et al, [1977, 8p.] CR 77-29 Oxygen isotopes in the basal zone of Matanuska Glacier.
MP 1687 Offshore mechanics and Arctic engineering symposium,	Implications of surface energy in ice adhesion. Itagaki, K., 1983, p.41-48 ₁ MP 1672	Lawson, D.E., et al, [1978, p.673-685] MP 1177
1984. [1984, 3 vois.] MP 1675	Measurement of ice forces on structures. Sodhi, D.S., et al,	Dynamics of near-shore ice. Kovscs, A., et al, (1978, p.11- 22 ₁ MP 1265
Ice action on two cylindrical structures. Kato, K., et al. [1984, p.107-112] MP 1741	[1983, p.139-155] MP 1641 Relationship between creep and strength behavior of ice at	Problems of offshore oil drilling in the Beaufort Sea. Weller,
Modeling the resilient behavior of frozen soils using unfrozen	failure. Cole, D.M., [1983, p.189-197] MP 1681	G., et al, [1978, p.4-11] MP 1250 Multi year pressure ridges in the Canadian Beaufort Sea.
water content. Cole, D.M., (1984, p.823-834) MP 1715	Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, [1984, p.235-259] MIP 1674	Wright, B., et al., [1979, p.107-126] MP 1229
Computational mechanics in arctic engineering. Sodhi, D.S.,	Preliminary examination of the effect of structure on the com-	Ross Ice Shelf bottom ice structure. Zotikov, I.A., et al., [1979, p.65-66] MIP 1336
[1984, p.351-374] MP 2072 Laboratory investigation of the kinetic friction coefficient of	pressive strength of ice samples from multi-year pressure ridges. Richter, J.A., et al, [1984, p.140-144]	Dynamics of near-shore ice. Kovaca, A., et al, [1979,
ice. Forland, K.A., et al, [1984, p.19-28] MP 1825	MP 1685	p.181-207 ₁ MP 1291 Preparation of polycrystalline ice specimens for laboratory
Crushing ice forces on cylindrical structures. Morris, C.E., et al, [1984, p.1-9] MP 1834	Variation of ice strength within and between multiyear pres- sure ridges in the Beaufort Sea. Weeks, W.F., [1984,	experiments. Cole, D.M., [1979, p.153-159] MP 1327
Kinetic friction coefficient of ice. Forland, K.A., et al,	p.134-139 ₁ MP 1690	Pebble orientation ice and glacial deposits. Lawson, D.E.,
[1985, 40p.] CR 85-06 Real-time measurements of uplifting ice forces. Zabilansky,	Summary of the strength and modulus of ice samples from multi-year pressure ridges. Cox, G.F.N., et al, 1984,	(1979, p.629-645) MP 1276
L.J., (1985, p.253-259) MIP 2092	p.126-133 ₃ MP 1679	Margin of the Greenland ice sheet at Isua. Colbeck, S.C., et al, [1979, p.155-165] MP 1281
In-ice calibration tests for an elongate, uniaxial brass ice stress sensor. Johnson, J.B., [1985, p.506-510] MP 1966	Influence of grain size on the ductility of ice. Cole, D.M., [1984, p.150-157] MP 1686	Morphology of sea ice pressure ridge sails. Tucker, W.B., et al, [1981, p.1-12] MP 1465
Crushing of ice sheet against rigid cylindrical structures.	Ice resistance tests on two models of the WTGB icebreaker. Tatinclaux, J.C., et al, [1984, p.627-638] MP 1716	Dynamic ice-structure interaction analysis for narrow vertical
Sodhi, D.S., et al, [1986, p.1-12] MP 2018 Flexural and buckling failure of floating ice sheets against	Dependence of crushing specific energy on the aspect ratio	structures. Eranti, B., et al, (1981, p.472-479) MP 1456
structures. Sodhi, D.S., [1986, p.339-359] MP 2134 Ios spectroscopy	and the structure velocity. Sodhi, D.S., et al. 1984, p.363-374; MP 1708	Multi-year pressure ridges in the Canadian Beaufort Sea.
Colloquium on Water in Planetary Regoliths, Hanover, N.H.,	Mechanical properties of multi-year sea ice. Phase 1: Test	Wright, B., et al, [1981, p.125-145] MIP 1514 Physical and structural characteristics of sea ice in McMurdo
Oct. 5-7, 1976. [1977, 161p.] MIP 911	results. Cox, G.F.N., et al., [1984, 105p.] CR 84-09 4th report of working group on testing methods in ice. Earle,	Sound. Gow, A.J., et al, [1981, p.94-95] MP 1542
Thermal patterns in ice under dynamic loading. Fish, A.M., et al, [1983, p.240-243] MP 1742	E.N., et al, [1984, p.1-41] MP 1886	Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.] SR 82-28
Electromagnetic properties of sea ice. Morey, R.M., et al, (1984, p.53-75) MP 1776	Flexural strengths of freshwater model ice. Gow, A.J., 1984, p.73-82, MP 1826	Physical, chemical and biological properties of winter see ice
Ice strength	Mechanical properties of sea ice: a status report. Weeks,	in the Weddell Sea. Clarke, D.B., et al, [1982, p.107- 109; MCP 1669
Interpretation of the tensile strength of ice under triaxial stress. Nevel, D.E., et al, (1976, p.375-387)	W.F., et al, [1984, p.135-198] MP 1868 Ice penetration tests. Garcis, N.B., et al, [1984, p.209-	Frazil ice. Daly, S.F., [1983, p.218-223] MP 2078
MP 996	240 ₁ MP 1996	First-generation model of ice deterioration. Ashton, G.D., [1983, p.273-278] MP 2000
Cantilever beam tests on reinforced ice. 'Dhstrom, E.G., et al, [1976, 12p.] CR 76-97	Tensile strength of multi-year pressure ridge ses ice samples. Cox, G.F.N., et al, (1985, p.186-193) MP 1856	Preliminary examination of the effect of structure on the com-
Interpretation of the tensile strength of ice under triaxial	Grain size and the compressive strength of ice. Cole, D.M.,	pressive strength of ice samples from multi-year pressure ridges. Richter, J.A., et al, [1984, p.140-144]
stresses. Nevel, D.E., et al, [1976, 9p.] CR 76-95 Sea ice properties and geometry. Weeks, W.F., [1976,	[1985, p.220-226] MP 1858 Compressive strength of pressure ridge ice samples. Richter-	MP 1665
p.137-171 ₃ MP 918	Menge, J.A., et al, [1985, p.465-475] MIP 1877	Variation of ice strength within and between multiyear pres- sure ridges in the Beaufort Sea. Weeks, W.F., [1984,
Force estimate and field measurements of the St. Marys River ice booms. Perham, R.B., (1977, 26p.) CR 77-04	Triaxial compression testing of ice. Cox, G.F.N., et al, 1985, p.476-488; MP 1878	p.134-139 ₁ MP 1600 Structure of first-year pressure ridge sails in the Prudhoe Bay
Measuring the uniaxial compressive strength of ice. Haynes,	Strength and modulus of ice from pressure ridges. Cox,	region. Tucker, W.B., et al, [1984, p.115-135]
F.D., et al, [1977, p.213-223] MIP 1927 Effect of temperature and strain rate on the strength of poly-	G.F.N., et al. (1985, p.93-98) MP 1848 Structure and the compressive strength of ice from pressure	MP 1837 Structure, salinity and density of multi-year ses ice pressure
crystalline ice. Haynes, P.D., [1977, p.107-111] MP 1127	ridges. Richter, J.A., et al, [1985, p.99-102] MP 1849	ridges. Richter-Menge, J.A., et al, [1985, p.194-198]
ME 112/	rat 1949	MP 1857

		14.4 4.41
Measuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al. (1985, p.55-67; MP 1916	Ice-covered North Slope lakes observed by radar. Weeks, W.F., et al, [1981, 17p.] CR 81-19	Methods of ice control. Frankenstein, G.E., et al., [1983, p.204-215] MP 1642
	W.F., et al, [1981, 17p.] CR 81-19 Frost susceptibility of soil; review of index tests. Chamber-	Model tests on two models of WTGB 140-foot icebreaker.
Pressure ridge and sea ice properties Greenland Sea. Tucker, W.B., et al, [1985, p.214-223] MP 1935	lain, E.J., [1981, 110p.] M \$1-62	Tatinclaux, J.C., [1984, 17p.] CR 84-03
Structure, salinity and density of multi-year sea ice pressure	Frost susceptibility of soil; review of index tests. Chamber-	lee registance tests on two models of the WTOB icebreaker.
ridaes. Richter-Mense, J.A., et al. (1985, p.493-497)	lain, R.J., [1982, 110p.] MIP 1857	Tatinclaux, J.C., et al, [1984, p.627-638] MP 1716
MP 1965	Soft drink bubbles. Cragin, J.H., [1983, p.71]	Model tests in ice of a Canadian Coast Guard R-class ice-
Electromagnetic measurements of sea ice. Kovaca, A., et al,	MP 1736	breaker. Tatinclaux, J.C., [1984, 24p.] SR 84-86
[1986, p.67-93] MP 2020	Relationship between ice and unfrozen water in frozen soils.	Propulsion tests in level ice on a model of a 140-ft WTGB
Physical properties of the sea ice cover. Weeks, W.F.,	Tice, A.R., et al, [1983, p.37-46] MP 1632	ioebreaker. Tatinclaux, J.C., [1985, 13p.] CR 85-64
[1986, p.87-102] MIP 2047	Properties of sea ice in the coastal zones of the polar oceans.	Level ice breaking by a simple wedge. Tatinclaux, J.C.,
Constitution Add and down Mills W/D III 1000	Weeks, W.P., et al, [1983, p.25-41] MP 1604	[1985, 46p.] CR 85-22
Sea ice growth, drift, and decay. Hibler, W.D., III, (1980, p.141-209) MP 1298	Marginal Ice Zone Experiment, Fram Strait/Greenland Sea, 1984. Johannessen, O.M., ed, [1983, 47p.]	Icoland
Sea ice rubble formations off the NE Bering Sea and Norton	SR 83-12	Utility distribution systems in Iceland. Aamot, H.W.C., [1976, 63p.] SR 76-05
Sound. Kovaca, A., (1981, p.1348-1363) MP 1527	Marginal ice zones: a description of air-ice-ocean interactive	• • • • • • • • • • • • • • • • • •
Surface roughness of Ross Sea pack ice. Govoni, J.W., et al,	processes, models and planned experiments. Johannessen,	Icing Roof response to icing conditions. Lane, J.W., et al, (1979,
[1983, p.123-124] MP 1764	O.M., et al, [1984, p.133-146] MIP 1673	40p.1 CR 79-17
Drag coefficient across the Antarctic marginal ice zone. An-	On the role of ice interaction in marginal ice zone dynamics.	Icing on structures. Minsk, L.D., (1980, 18p.)
dress, E.L., et al, [1984, p.63-71] MP 1784	Lepparanta, M., et al, [1984, p.23-29] MP 1781	CR 89-31
Dynamic friction of bobaled runners on ice. Huber, N.P., et	On the decay and retrest of the ice cover in the summer MIZ. Maykut, G.A., [1984, p.15-22] MIP 1780	Window performance in extreme cold. Planders, S.N., et al,
al, [1985, 26p.] MP 2002	Modeling the marginal ice zone. Hibler, W.D., III, ed,	(1982, 21p.) CR 82-38
Ice surveys	[1984, 99p.] SR 84-07	Atmospheric icing of structures. Minsk, L.D., ed, [1983,
Notes and quotes from snow and ice observers in Alaska. Bilello, M.A., (1979, p.116-118; MP 1631	Large-scale ice/ocean model for the marginal ice zone. Hi-	366p. ₃ SR 83-17
Bilello, M.A., (1979, p.116-118) MP 1631 Bibliography on glaciers and permafrost, China, 1938-1979.	bler, W.D., III, et al, [1984, p.1-7] MP 1778	How effective are icephobic coatings. Minsk, L.D., [1983,
Shen, J., ed, [1982, 44p.] SR 82-20	Temperature and interface morphology in a melting ice-water	p.93-95 ₁ MP 1634
Proceedings of the Symposium on Applied Glaciology, 2nd,	system. Yen, YC., [1984, p.305-325] MIP 1727	Application of a block copolymer solution to ice-prone struc- tures. Hanamoto, B., (1983, p.155-158) MP 1636
1982. (1983, 314p.) MP 2054	Ocean circulation: its effect on seasonal sea-ice simulations.	
Ice engineering facility. Zabilansky, L.J., et al, [1983, 12p.	Hibler, W.D., III, et al, [1984, p.489-492] MP 1700	Aerostat icing problems. Hanamoto, B., [1983, 29p.] SR 83-23
+ fig.) MP 2008	Technique for observing freezing fronts. Colbeck, S.C.,	Mechanical ice relesse from high-speed rotors. Itagaki, K.,
Field investigation of St. Lawrence River hanging ice dams.	[1985, p.13-20] MP 1861	[1983, 8p.] CR 83-26
Shen, H.T., et al, [1984, p.241-249] MP 1830	Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed, [1985, 119p.]	Atmospheric icing on sea structures. Makkonen, L., [1984,
Snow, ice and frozen ground research at the Sleepers River,	M12.5A-West. Wadnams, r., ed, [1783, 117p.]	92p.; M 84-02
VT. Pangburn, T., et al, (1984, p.229-240)	Ice (water storage)	leing rate on stationary structures under marine conditions.
MP 2071	Some elements of iceberg technology. Weeks, W.F., et al,	Itagaki, K., [1984, 9p.] CR 84-12
Topical databases: Cold Regions Technology on-line. Liston, N., et al, [1985, p.12-15] MP 2027	[1978, 31p.] CR 78-02	Survey of ice problem areas in navigable waterways. Zufelt,
Techniques for measurement of snow and ice on freshwater.	ICE WEDGES	J., et al, [1985, 32p.] SR 85-02
Adams, W.P., et al, [1986, p.174-222] MP 2900	Patterned ground in Alaska. Péwé, T.L., et al, [1969, 87p.]	Measurement of icing on offshore structures. Minsk, L.D.,
Ice temperature	MP 1190	[1985, p.287-292] MIP 2010
Nearshore ice motion near Prudhoe Bay, Alaska. Tucker,	Ice wedges	Comparison of winter climatic data for three New Hampshire
W.B., et al, [1977, p.23-31] MP 1162	Electromagnetic survey in permafrost. Sellmann, P.V., et al,	sites. Govoni, J.W., et al, [1986, 78p.] SR 86-65
Equations for determining the gas and brine volumes in sea	[1979, 7p.] SR 79-14	Transfer of meteorological data from mountain-top sites. Govoni, J.W., et al, [1986, 6p.] MP 2107
ice samples. Cox, G.F.N., et al. [1982, 11p.]	Bending and buckling of a wedge on an elastic foundation.	
CR 82-30	Nevel, D.E., [1980, p.278-288] MP 1303 Ice floe distribution in the wake of a simple wedge. Tatin-	Conductor twisting resistance effects on ice build-up and ice shedding. Govoni, J.W., et al, [1986, 8p. + figs.] MP 2100
Surface meteorology US/USSR Weddell Polynya Expedition, 1981. Andreas, E.L., et al. (1983, 32p.) SR \$3-14	claux, J.C., (1986, p.622-629) MP 2038	MP 2100
	Iceberg towing	Communication tower icing in the New England region.
Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] MP 1788	Some elements of iceberg technology. Weeks, W.F., et al,	Mulherin, N., et al, [1986, 7p.] MP 2109
	1079 - 45 09.	IMPACT STRENGTH
les properties in a grounded man-made ice island. Cox.	[1978, p.45-98] MP 1616	
Ice properties in a grounded man-made ice island. Cox, G.F.N., et al. 1986, p.135-1421 MP 2032		Impact of spheres on ice. Closure. Yen, YC., et al,
G.F.N., et al, [1986, p.135-142] MIP 2032	Some elements of iceberg technology. Weeks, W.F., et al. [1978, 31p.]	Impact of spheres on ice. Closure. Yen, YC., et al., (1972, p.473) MIP 908
	Some elements of iceberg technology. Weeks, W.F., et al. [1978, 31p.] CR 78-62 Prospects for towing icebergs from the Southern Ocean.	Impact of spheres on ice. Closure. Yen, YC., et al, (1972, p.473) MP 908 Impact strength
G.F.N., et al, [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al, [1971, p.117-126]	Some elements of iceberg technology. Weeks, W.F., et al. [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. [1979, p.66-75] MP 1385	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] MP 988 Impact strength Remote sensing of accumulated frazil and brash ice. Dean,
G.F.N., et al, [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al, [1971, p.117-126] MP 1009	Some elements of iceberg technology. Weeks, W.F., et al. CR 78-62 [1978, 31p.] rospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. [1979, p.66-75] MP 1365 Power requirements and methods for long distance large ice-	Impact of spheres on ice. Closure. Yen, YC., et al, [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] MIP 934
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126, MP 1609 River ice problems. Burgi, P.H., et al., [1974, p.1-15]	Some elements of iceberg technology. Weeks, W.F., et al. [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. [1979, p.66-75] NP 1305 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240]	Impact of spheres on ice. Closure. Yen, YC., et al., 1972, p.473, MP 988 Impact strength Remote sensing of socumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovaca,
G.F.N., et al, [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al, [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al, [1974, p.1-15] MP 1002	Some elements of iceberg technology. Weeks, W.F., et al. [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. [1979, p.66-75] MP 1385 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] MP 988 Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) MP 934 Brazil tensile strength tests on see ice: a data report. Kovaca. A., et al., (1977, 39p.) SR 77-24
G.F.N., et al, [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al, [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al, [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al, [1977,	Some elements of iceberg technology. Weeks, W.F., et al. [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] NMP 1365 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-	Impact of spheres on ice. Closure. Yen, YC., et al., 1972, p.473, MP 988 Impact strength Remote sensing of socumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovaca,
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126, MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15, MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531, MP 1063	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] NP 1365 Power requirements and methods for long distance large loeberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10]	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p., Ice and ship effects on the St. Marys River ice booma. Per- ham, R.E., (1978, p.222-230) MP 1617
G.F.N., et al, [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al, [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al, [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al, [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake	Some elements of iceberg technology. Weeks, W.F., et al. (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. (1979, p.66-75) Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Icebergs	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on sea ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and skip effects on the St. Marys River ice booms. Per-
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126, MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15, MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531, MP 1063	Some elements of iceberg technology. Weeks, W.F., et al. (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. (1979, p.66-75) NP 1365 Power requirements and methods for long distance large loeberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10)	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p.] Ice and ship effects on the St. Marys River ice booma. Per- ham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. John- son, P.R., et al., (1979, 40p.) Cost of ice damage to shorebine structures during navigation.
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02	Some elements of iceberg technology. Weeks, W.F., et al. (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. (1979, p.66-75) Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Icebergs Towing icebergs. Lonsdale, H.K., et al. (1974, p.2) NIP 1226 Obtaining fresh water from icebergs. Mellor, M., (1977,	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.475] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.)
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.17-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III., [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen,	Some elements of iceberg technology. Weeks, W.F., et al, [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, [1979, p.66-75] MP 1385 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Icebergs Towing icebergs. Lonsdale, H.K., et al, [1974, p.2] MP 1260 Obtaining fresh water from icebergs. Mellor, M., [1970, p.193] MP 1117	Impact of spheres on ice. Closure. Yen, YC., et al., 1972, p.473, 1898: Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovacs, A., et al., (1977, 39p., 10e and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. SR 80-22. Impact flue performance in snow (Initial evaluation of a new
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126, MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15, MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531, MP 1063 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p., CR 96-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p., SR 80-68 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] CR 81-10	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large loeberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] MP 1365 Icebergs Towing icebergs. Lonsdale, H.K., et al., [1974, p.2] MP 1826 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] MP 1117 Iceberg thickness profiling using an impulse radar. Kovaca,	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booma. Perham, R.B., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-4.5)
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] Champlain. Bates, R.E., [1980, 25p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibber, W.D., III, [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F.,	Some elements of iceberg technology. Weeks, W.F., et al. (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. (1979, p.66-75) Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Icebergs Towing icebergs. Lonsdale, H.K., et al. (1974, p.2) MP 1345 Obtaining fresh water from icebergs. Mellor, M., (1977, p.193) Iceberg thickness profiling using an impulse radar. Kovacs, A., (1977, p.140-142) MP 1612	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. A., et al., (1977, 39p.) Ise and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) MP 1504 Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126], MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15, MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 89-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 89-68 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, atructure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] M 82-01	Some elements of iceberg technology. Weeks, W.F., et al, [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, [1979, p.66-75] NP 1395 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Icebergs Towing icebergs. Lonsdale, H.K., et al, [1974, p.2] NP 1365 Icebergs Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovacs, A., [1977, p.140-142] Loeberg thickness and crack detection. Kovacs, A., [1978,	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booma. Perham, R.B., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-4.5)
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126, MP 1002 River ice problems. Burgi, P.H., et al., [1974, p.1-15, MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531, MP 1063 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 80-88 Review of thermal properties of snow, ice and sea ice. Yes., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M.,	Some elements of iceberg technology. Weeks, W.F., et al., (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., (1979, p.66-75) Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Towing icebergs. Lonsdale, H.K., et al., (1974, p.2) NP 1826 Obtaining fresh water from icebergs. Mellor, M., (1977, p.193) Iceberg thickness profiling using an impulse radar. Kovacs, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovacs, A., (1978, p.131-145) MP 1128	Impact of spheres on ice. Closure. Yen, YC., et al., 1972, p.473, 1 MP 988 Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovacs, A., et al., (1977, 39p., 1 ce and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) MP 1930 Cost of ice damage to shoreline structures during navigation. Carry, K.L., (1980, 33p.) SR 88-22 Impact flue performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) Ship resistance in thick brash ice. Mellor, M., (1980, p.305-
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III., [1980, 35p.] SR 80-88 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M. MP 1742	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Rosbergs Towing icebergs. Lonsdale, H.K., et al., [1974, p.2] MP 1365 Rosbergs Towing icebergs. Lonsdale, H.K., et al., [1974, p.2] MP 1620 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovacs, A., [1977, p.140-142] Loeberg thickness and crack detection. Kovacs, A., [1978, p.131-145] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.43-98]	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p.] Ice and ship effects on the St. Marys River ice booma. Per- ham, R.E., [1978, p.222-230] MP 1617 Ice forces on the Yukon River bridge—1978 breakup. John- son, P.R., et al., [1979, 40p.] Cost of ice damage to shoretime structures during navigation. Carey, K.L., [1980, 33p.] Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Rich- mond, P.W., [1980, p.801-823] MP 1490 Ship resistance in thick brash ice. Mellor, M., [1980, p.305- 321] MP 1329
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126, MP 1002 River ice problems. Burgi, P.H., et al., [1974, p.1-15, MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531, MP 1063 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 80-88 Review of thermal properties of snow, ice and sea ice. Yes., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M.,	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] MP 1365 Icebergs Towing icebergs. Lonsdale, H.K., et al., [1974, p.2] MP 1826 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovaca, A., [1977, p.140-142] Iceberg thickness and crack detection. Kovaca, A., [1978, p.131-145] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.45-98] Iceberg thickness profiling. Kovaca, A., [1978, p.766-774]	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booma. Perham, R.B., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1490 Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) MC 1329 Ice force measurement on the Yukon River bridge. McFad-
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1009 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.B., [1980, 26p.] CR 89-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 89-98 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] CR 81-10 Growth, structure, and properties of sea ice. Weeks, W.F. et al., [1982, 130p.] M 82-01 Thermal patterns in ice under dynamic loading. et al., [1983, p.240-243] Preliminary investigation of thermal ice pressures. Cox,	Some elements of iceberg technology. Weeks, W.F., et al, [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, [1979, p.66-75] MP 1385 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Iceberg water: an assessment. Weeks, W.F., [1970, p.5-10] Iceberg towing icebergs. Lonsdale, H.K., et al, [1974, p.2] MP 1826 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovaca, A., [1977, p.140-142] Iceberg thickness and crack detection. p.131-1457 Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98] Iceberg thickness profiling. Kovaca, A., [1978, p.766-774, MP 1616	Impact of spheres on ice. Closure. Yen, YC., et al., 1972, p.473, 1898: Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovacs, A., et al., (1977, 39p., SR 77-24) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) MP 1394 Cost of ice damage to shoreline structures during navigation. Carry, K.L., (1980, 33p.) SR 80-22 Impact flue performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1349 Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Ice force measurement on the Yukon River bridge. McPadden, T., et al., (1981, p.749-777) MP 1396
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1009 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.B., [1980, 26p.] CR 88-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 80-08 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F. et al., [1982, 130p.] M 82-01 Thermal patterns in ice under dynamic loading. Fish, A.M., MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska.	Some elements of iceberg technology. Weeks, W.F., et al, [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, [1979, p.66-75] NP 1395 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] NP 1365 Icebergs Towing icebergs. Lonsdale, H.K., et al, [1974, p.2] NP 1620 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovacs, A., [1977, p.140-142] Ceberg thickness and crack detection. Kovacs, A., [1978, p.31-145] Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98] Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booma. Per- ham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. John- son, P.R., et al., (1979, 40p.) Cost of ice damage to shoretime structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45, MP 1347 Small caliber projectile penetration in frozen soil. Rich- mond, P.W., (1980, p.801-823) MP 1690 Ship resistance in thick brash ice. Mellor, M., (1980, p.305- 321) MP 1329 Ice force measurement on the Yukon River bridge. McPad- den, T., et al., (1981, p.749-777) Messurement of ice forces on structures. Sodhi, D.S., et al,
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126, MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15, MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1003 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 80-08 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] CR 81-10 Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ground ice in perennially frozen sediments, northern Alsaka. Lawson, D.E., [1983, p.695-700]	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] MP 1276 NMP 1365 Icebergs Towing icebergs. Lonsdale, H.K., et al., [1974, p.2] NMP 1826 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovacs, A., [1977, p.140-142] Iceberg thickness and crack detection. Kovacs, A., [1978, p.131-145] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.45-98] Iceberg thickness profiling. Kovacs, A., [1978, p.766-774] MP 1616 Destruction of ice islands with explosives. Mellor, M., et al., [1978, p.753-765] MP 1618	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booma. Perham, R.B., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1347 Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Ice force measurement on the Yukon River bridge. McPadden, T., et al., (1981, p.749-777) Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) MP 1641
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126], MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15], MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 80-68 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. et al., [1983, p.240-243] Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1661	Some elements of iceberg technology. Weeks, W.F., et al, [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, [1979, p.66-75] MP 1385 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] MP 1365 Icebergs Towing icebergs. Lonsdale, H.K., et al, [1974, p.2] MP 1612 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] MP 1117 Iceberg thickness profiling using an impulse radar. Kovaca, A., [1977, p.140-142] Iceberg thickness and crack detection. Kovaca, A., [1978, p.131-145] Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98] Iceberg thickness profiling. Kovaca, A., [1978, p.766-774] MP 1619 Destruction of ice islands with explosives. Mellor, M., et al, [1978, p.753-765] Icebergs an overview. Kovaca, A., [1979, 7p.]	Impact of spheres on ice. Closure. Yen, YC., et al., 1972, p.473, Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, 39p., IMP 934 Remote sensing strength tests on see ice: a data report. Kovaca, A., et al., (1977, 39p., IMP 1617 Ice and ship effects on the St. Marys River ice booma. Perham, R.E., (1978, p.222-230) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact flue performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Ice force measurement on the Yukon River bridge. McFasdden, T., et al., [1981, p.749-777] MP 1396 Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) MR 1641 Mechanics of ice cover breakthrough. Kert, A.D., [1984,
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1009 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.B., [1980, 26p.] CR 89-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 80-08 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F. et al., [1982, 130p.] M 82-01 Thermal patterns in ice under dynamic loading. Fish, A.M., MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska, Lawson, D.E., [1983, p.695-700] MP 1661 Ice water taterface Formation of ice ripples on the underside of river ice covers.	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] MP 1365 Icebergs Towing icebergs. Lonsdale, H.K., et al., [1974, p.2] MP 1369 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] MP 1171 Iceberg thickness profiling using an impulse radar. Kovacs, A., [1977, p.140-142] Iceberg thickness and crack detection. Kovacs, A., [1978, p.31-145] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.45-98] Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616 Icebergs: an overview. Kovacs, A., [1979, 7p.] Icebergs: an overview. Kovacs, A., [1979, 7p.] SR 79-21	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booma. Per- ham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. John- son, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45, MP 1347 Small caliber projectile penetration in frozen soil. Rich- mond, P.W., (1980, p.801-823) MP 1849 Ship resistance in thick brash ice. Mellor, M., (1980, p.305- 321) MP 1339 Ice force measurement on the Yukon River bridge. McFac- den, T., et al., (1981, p.749-777) Messurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) MP 1841 Mechanics of ice cover breakthrough. Kerr, A.D., (1984, P.245-262)
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibber, W.D., III, [1980, 35p.] SR 80-88 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1661 Ice water interface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.]	Some elements of iceberg technology. Weeks, W.F., et al, (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, (1979, p.66-75) Power requirements and methods for long distance large iceberg towing. Melior, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Icebergs Towing icebergs. Lonadale, H.K., et al, (1974, p.2) MP 1345 Icebergs Towing icebergs. Lonadale, H.K., et al, (1974, p.2) MP 1920 Obtaining fresh water from icebergs. Mellor, M., (1977, p.193) Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al, (1978, p.45-98) Iceberg thickness profiling. Kovaca, A., (1978, p.753-765) Destruction of ice islands with explosives. Mellor, M., et al, (1978, p.753-765) ICEBERGS I	Impact of spheres on ice. Closure. Yen, YC., et al., 1972, p.473, Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, 39p., IMP 934 Remote sensing strength tests on see ice: a data report. Kovaca, A., et al., (1977, 39p., IMP 1617 Ice and ship effects on the St. Marys River ice booma. Perham, R.E., (1978, p.222-230) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact flue performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Ice force measurement on the Yukon River bridge. McFasdden, T., et al., [1981, p.749-777] MP 1396 Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) MR 1641 Mechanics of ice cover breakthrough. Kert, A.D., [1984,
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126], MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15], MP 1009 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 89-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] CR 89-08 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeka, W.F., et al., [1982, 130p.] MS 2-01 Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] MP 1788 Ice volume Ground ice in perennially frozen sediments, northern Alsaka. Lawson, D.E., [1983, p.695-700] MP 1661 Ice water statesface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] MP 1243 Radar imagery of ice covered North Slope lakes. Weeks,	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovaca, A., [1977, p.140-142] Iceberg thickness and crack detection. Kovaca, A., [1978, p.7131-145] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.753-765] Iceberg thickness profiling. Kovaca, A., [1978, p.766-774] MP 1616 Iceberg thickness profiling. Kovaca, A., [1978, p.766-774] MP 1619 Destruction of ice islands with explosives. Mellor, M., et al., [1978, p.753-765] Icebergs: an overview. Kovaca, A., [1979, 7p.] Overview on the seasonal sea ice zone. Weeks, W.F., et al., [1979, p.320-337] MP 1320	Impact of spheres on ice. Closure. Yen, YC., et al., 1972, p.473, Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovaca, A., et al., (1977, 39p., SR 77-24) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Pr. MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) MP 1394 Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Cost of ice damage to shoreline structures during navigation. SR 88-22 Impact flue performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1349 Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Ice force measurement on the Yukon River bridge. McPadden, T., et al., (1981, p.749-777) Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) MP 1641 Mechanics of ice cover breakthrough. Kert, A.D., (1984, p.245-262) Ice penetration tests. Garcia, N.B., et al., (1985, p.223-
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1002 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.B., [1980, 26p.] Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III., [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1661 Ice water interface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] MP 1243 Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] MP 923	Some elements of iceberg technology. Weeks, W.F., et al, (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, (1979, p.66-75) Power requirements and methods for long distance large iceberg towing. Melior, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Icebergs Towing icebergs. Lonadale, H.K., et al, (1974, p.2) MP 1345 Icebergs Towing icebergs. Lonadale, H.K., et al, (1974, p.2) MP 1920 Obtaining fresh water from icebergs. Mellor, M., (1977, p.193) Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al, (1978, p.45-98) Iceberg thickness profiling. Kovaca, A., (1978, p.753-765) Destruction of ice islands with explosives. Mellor, M., et al, (1978, p.753-765) ICEBERGS I	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booms. Per- ham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Per- ham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. John- son, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact flue performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MRP 1347 Small caliber projectile penetration in frozen soil. Rich- mond, P.W., (1980, p.801-823) MRP 1349 Ship resistance in thick brash ice. Mellor, M., (1980, p.305- 321; Ice force measurement on the Yukon River bridge. McFad- den, T., et al., [1981, p.749-777] MRP 1396 Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) Ice penetration tests. Garcia, N.B., et al., [1984, P.245-262) Impact ice force and pressure: An experimental study with ures ice. Sodhi, D.S., et al., [1986, p.569-576)
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126], MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15], MP 1009 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 89-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] CR 89-08 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeka, W.F., et al., [1982, 130p.] MS 2-01 Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] MP 1788 Ice volume Ground ice in perennially frozen sediments, northern Alsaka. Lawson, D.E., [1983, p.695-700] MP 1661 Ice water statesface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] MP 1243 Radar imagery of ice covered North Slope lakes. Weeks,	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] NP 1395 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Iceberg water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovaca, A., [1977, p.140-142] Iceberg thickness and crack detection. Kovaca, A., [1978, p.131-145] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.45-98] Iceberg thickness profiling. Kovaca, A., [1978, p.766-774] MP 1616 Iceberg thickness profiling. Kovaca, A., [1978, p.766-774] MP 1619 Destruction of ice islands with explosives. Mellor, M., et al., [1978, p.753-765] Icebergs: an overview. Kovaca, A., [1979, 7p.] Overview on the seasonal sea ice zone. Weeks, W.F., et al., [1979, p.320-337] Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Dynamics of snow and ice masses. Colbeck, S.C., ed,	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1978, p.29-230] Ice and ship effects on the St. Marys River ice booma. Per- ham, R.E., [1978, p.222-230] MP 1617 Ice forces on the Yukon River bridge—1978 breakup. John- son, P.R., et al., [1979, 40p.] Cost of ice damage to shoreline structures during navigation. Carey, K.L., [1980, 33p.] Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Rich- mond, P.W., [1980, p.801-823] Ship resistance in thick brash ice. Mellor, M., [1980, p.305- 321] Ice force measurement on the Yukon River bridge. MP 1329 Ice force measurement on the Yukon River bridge. MP 1329 Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) Mechanics of ice cover breakthrough. Kerr, A.D., [1984, p.245-262] Impact ice force and pressure: An experimental study with urse ice. Sodhi, D.S., et al., [1986, p.569-576] MP 2837
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibber, W.D., III, [1980, 35p.] CR 80-08 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1661 Ice water interface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] MP 243 Radar imagery of ice covered North Slope lakes. Weeks, W.F. et al., [1977, p.129-136] Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] CR 77-15 Effect of the oceanic boundary layer on the mean crift of pack	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] MP 1365 Iceberg water: an assessment. Weeks, W.F., [1970, p.5-10] MP 1626 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovacs, A., [1977, p.140-142] Iceberg thickness and crack detection. Kovacs, A., [1978, p.766-774, MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774] MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774] MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774] MP 1616 Iceberg: an overview. Kovacs, A., [1979, 7p.] SR 79-21 Overview on the seasonal ses ice zone. Weeks, W.F., et al., (1979, p.320-337) Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Dynamics of snow and ice masses. Colbeck, S.C., et [1980, 468p.] MP 1287	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p., Ice and ship effects on the St. Marys River ice booma. Per- ham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. John- son, P.R., et al., (1979, 40p., Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.,) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45, MP 1347 Small caliber projectile penetration in frozen soil. Rich- mond, P.W., (1980, p.801-823, MP 1997 Ship resistance in thick brash ice. Mellor, M., (1980, p.305- 321, MP 1349 Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155, MP 1997 Ice penetration tests. Garcia, N.B., et al., (1985, p.223- 236) Impact toe force and pressure: An experimental study with ures ice. Sodhi, D.S., et al., [1986, p.569-576] MP 2837 Impact tests
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.17-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 80-86 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] Preliminary investigation of thermal ice pressures. Cox, MP 1742 Preliminary investigation of thermal ice pressures. Cox, MP 1788 Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1742 Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] CR 77-15 Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.O., [1979, 1979,	Some elements of iceberg technology. Weeks, W.F., et al, (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, (1979, p.56-75) MP 1385 Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water from icebergs. Mellor, M., (1977, p.193) MP 1127 Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al, (1978, p.45-98) Iceberg thickness profiling. Kovaca, A., (1978, p.766-774) MP 1619 Destruction of ice islands with explosives. Mellor, M., et al, (1978, p.753-765) Iceberg: an overview. Kovaca, A., (1979, 7p.) Overview on the seasonal sea ice zone. Weeks, W.F., et al, (1979, p.320-337) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1360 Dynamics of snow and ice masses. Colbeck, S.C., ed, (1980, 468p.) Mechanical properties of ice in the Arctic seas. Weeks, Weeks,	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Ice force measurement on the Yukon River bridge. McFadden, T., et al., [1981, p.749-777] MP 1329 Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Impact toes force and pressure: An experimental study with ures ice. Sodhi, D.S., et al., [1986, p.569-576] Impact toes Report of the ITTC panel on testing in ice, 1978. Franken-
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126]. MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.11-15]. MP 1009 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.B., [1980, 26p.] Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.) Thermal patterns in ice under dynamic loading. Fish, A.M., MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ite volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.B., [1983, p.695-700] MP 1788 Redar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] Effect of the coesanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p.388-400] MP 1198	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Iceberg water water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kowaca, A., [1977, p.140-142] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.31-145] Iceberg thickness profiling. Kovaca, A., [1978, MP 1616] Iceberg thickness profiling. Kovaca, A., [1978, MP 1616] Iceberg thickness and crack detection. Kovaca, A., [1978, p.753-765] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.753-765] Icebergs an overview. Kovaca, A., [1979, 7p.] Overview on the seasonal sea ice zone. (1979, p.320-337) Iceberg water: an assessment. Weeks, W.F., et al., [1979, p.320-337] Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Dynamics of snow and ice masses. Colbeck, S.C., ed., [1980, 468p.] Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al., [1984, p.235-259]	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p.] Ice and ship effects on the St. Marys River ice booms. Perham, R.E., [1978, p.222-230] MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.] Cost of ice damage to shoreline structures during navigation. SR 89-22 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., [1980, p.801-823] Ship resistance in thick brash ice. Mellor, M., [1980, p.305-321] Ice force measurement on the Yukon River bridge. McFadden, T., et al., [1981, p.749-777] Messurement of ice forces on structures. Sodhi, D.S., et al., [1983, p.139-155] Mechanics of ice cover breakthrough. Kerr, A.D., [1984, p.245-262] Impact toe force and pressure: An experimental study with ures ice. Sodhi, D.S., et al., [1986, p.569-576] Impact toets Report of the ITTC panel on testing in ice, 1978. MP 1449 Prankenstein, G.E., et al., [1976, p.157-179] MP 1179
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1063 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] CR 80-88 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] CR 81-10 Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] M8 2-01 Thermal patterns in ice under dynamic loading. Fish, A.M. P 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1743 Ice water interface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] MP 1243 Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p.388-400] Turbulent heat transfer from a river to its ice cover. Haynes,	Some elements of iceberg technology. Weeks, W.F., et al, (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, (1979, p.66-75) MP 1385 Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Icebergs Towing icebergs. Lonsdale, H.K., et al, (1974, p.2) MP 1345 Icebergs Towing icebergs. Lonsdale, H.K., et al, (1974, p.2) MP 1170 Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al, (1978, p.45-98) Iceberg thickness profiling. Kovaca, A., (1978, p.753-765) Destruction of ice islands with explosives. Mellor, M., et al, (1979, p.320-337) Icebergs: an overview. Kovaca, A., (1979, 7p.) Overview on the seasonal sea ice zone. Weeks, W.F., (1980, p.5-10) Dynamics of snow and ice masses. Colbeck, S.C., ed, (1980, 468p.) MP 1297 Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, (1984, p.235-259) Icebergs lakes	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p.] Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1393 Step 132-132 Ice force measurement on the Yukon River bridge. McPadden, T., et al., [1981, p.749-777] Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) Measurement of ice force on structures. Sodhi, D.S., et al., (1983, p.139-155) Impact ice force and pressure: An experimental study with ures ice. Sodhi, D.S., et al., [1986, p.569-576] Impact tests Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., [1978, p.157-179] MP 1349 Practure behavior of ice in Charpy impact testing. Itagaki, I
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.17-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] SR 80-68 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] MP 1788 Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1265 Reperimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] CR 77-15 Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p. 388-400] Turbulent heat transfer from a river to its ice covert. Haynes, CR 79-13	Some elements of iceberg technology. Weeks, W.F., et al, (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, (1979, p.66-75) MP 1385 Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water from icebergs. Mellor, M., (1977, p.193) MP 1127 Iceberg thickness profiling using an impulse radar. Kovacs, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovacs, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al, (1978, p.45-98) Iceberg thickness profiling. Kovacs, A., (1978, p.766-774) MP 1616 Iceberg thickness profiling. Kovacs, A., (1978, p.766-774) MP 1619 Destruction of ice islands with explosives. Mellor, M., et al, (1978, p.753-765) Iceberg: an overview. Kovacs, A., (1979, 7p.) Overview on the seasonal ses ice zone. Weeks, W.F., et al, (1979, p.320-337) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Mechanical properties of ice in the Arctic sees. Weeks, W.F., et al, (1984, p.235-259) Icebewal lakes Ice-covered North Slope lakes observed by radar. Weeks,	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p.] Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.] Cost of ice damage to shoreline structures during navigation. SR 99-22 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., [1980, p.801-823] Ship resistance in thick brash ice. Mellor, M., [1980, p.305-321] Ice force measurement on the Yukon River bridge. McFadden, T., et al., [1981, p.749-777] Messurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) Mechanics of ice cover breakthrough. Kerr, A.D., [1984, p.245-262] Impact toes force and pressure: An experimental study with ures ice. Sodhi, D.S., et al., [1986, p.569-576] Impact tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179) MP 2837 Impact tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179) MP 2837
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1063 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibber, W.D., III, [1980, 35p.] SR 80-88 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] CR 81-10 Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] MR 22-01 Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1661 Ice water interface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] MP 1243 Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] MP 923 Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] CR 77-13 Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p. 384-400] Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., [1979, 5p.]	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Iceberg water water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovacs, A., [1977, p.140-142] Iceberg thickness profiling using an impulse radar. Kovacs, MP 1612 Iceberg thickness and crack detection. Kovacs, A., [1978, p.131-145] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.753-765] Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1619 Destruction of ice islands with explosives. Mellor, M., et al., [1978, p.753-765] Icebergs: an overview. Kovacs, A., [1979, 7p.] Overview on the seasonal sea ice zone. Weeks, W.F., et al., [1979, p.320-337] Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Dynamics of snow and ice masses. Colbeck, S.C., ed., [1980, 468p.] Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al., [1984, p.235-259] MP 1674 Icebeund lakes Ice-covered North Slope lakes observed by radar. Weeks, W.F., et al., [1981, 17p.]	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booma. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoretime structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1849 Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Messurement of ice forces on structures. Sodhi, D.S., et al., (1981, p.139-155) Messurement of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Impact ice force and pressure: An experimental study with ures ice. Sodhi, D.S., et al., (1983, p.139-155) Impact tests Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., (1980, p.157-179) MP 1283 Inspect tests Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., (1980, 13p.) Dynamic testing of free field stress gages in frozen soil. Aitk-
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.17-126] MP 1002 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III., [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M. Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] Ice water taterface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] Steptemental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] CR 77-15 Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p.388-400] Turbulent heat transfer from a river to its ice cover. F.D., et al., [1979, [1980, p.93-132] MP 1284	Some elements of iceberg technology. Weeks, W.F., et al, (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, (1979, p.66-75) MP 1385 Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Icebergs Towing icebergs. Lonsdale, H.K., et al, (1974, p.2) MP 1345 Icebergs Towing icebergs. Lonsdale, H.K., et al, (1974, p.2) MP 1171 Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al, (1978, p.45-98) Iceberg thickness profiling. Kovaca, A., (1978, p.753-765) Destruction of ice islands with explosives. Mellor, M., et al, (1979, p.320-337) Icebergs: an overview. Kovaca, A., (1979, 7p.) Overview on the seasonal ses ice zone. Weeks, W.F., et al, (1979, p.320-337) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1365 Dynamics of snow and ice masses. Colbeck, S.C., ed, (1980, 468p.) Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, (1984, p.235-259) Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, (1984, p.235-259) Iceberg water: al, (1984, p.235-259) Iceberg water: an issuessment. Weeks, W.F., et al, (1986, p.235-259) Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, (1984, p.235-259) Iceberg water: al, (1981, 17p.) Iceberg w	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovaca, A., et al., (1977, 39p., SR 77-24) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. SR 86-22 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1349 Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Ice force measurement on the Yukon River bridge. McPadden, T., et al., (1981, p.749-777) Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) MP 1349 Mechanics of ice cover breakthrough. Kert, A.D., (1984, p.245-262) Impact toe force and pressure: An experimental study time tree ice. Sodhi, D.S., et al., (1985, p.23-236) Impact tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., (1978, p.157-179) MP 2837 Impact tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., (1978, p.157-179) Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., (1980, 13p.) Dynamic testing of free field stress gages in frozen soil. Aikeen, G.W., et al., (1980, 26p.)
G.F.N., et al., [1986, p.135-142] MP 2032 Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1063 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibber, W.D., III, [1980, 35p.] SR 80-88 Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] CR 81-10 Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] MR 22-01 Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1661 Ice water interface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] MP 1243 Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] MP 923 Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] CR 77-13 Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p. 384-400] Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., [1979, 5p.]	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Iceberg water water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovacs, A., [1977, p.140-142] Iceberg thickness profiling using an impulse radar. Kovacs, MP 1612 Iceberg thickness and crack detection. Kovacs, A., [1978, p.131-145] Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.753-765] Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1616 Iceberg thickness profiling. Kovacs, A., [1978, p.766-774, MP 1619 Destruction of ice islands with explosives. Mellor, M., et al., [1978, p.753-765] Icebergs: an overview. Kovacs, A., [1979, 7p.] Overview on the seasonal sea ice zone. Weeks, W.F., et al., [1979, p.320-337] Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Dynamics of snow and ice masses. Colbeck, S.C., ed., [1980, 468p.] Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al., [1984, p.235-259] MP 1674 Icebeund lakes Ice-covered North Slope lakes observed by radar. Weeks, W.F., et al., [1981, 17p.]	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booma. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoretime structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1849 Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Messurement of ice forces on structures. Sodhi, D.S., et al., (1981, p.139-155) Messurement of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Impact ice force and pressure: An experimental study with ures ice. Sodhi, D.S., et al., (1983, p.139-155) Impact tests Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., (1980, p.157-179) MP 1283 Inspect tests Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., (1980, 13p.) Dynamic testing of free field stress gages in frozen soil. Aitk-
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibber, W.D., III, [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1785 Ice water interface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] CR 77-13 Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p., 388-400] Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., [1979, 5p.] Physical oceanography of the seasonal sea ice zone. McPhee, M.G., [1980, p.1-35] MP 1294 Problems of the seasonal sea ice zone. Weeks, W.F., [1980, p.1-35]	Some elements of iceberg technology. Weeks, W.F., et al, (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, (1979, p.66-75) MP 1365 Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water from icebergs. Mellor, M., (1977, p.193) MP 1226 Obtaining fresh water from icebergs. Mellor, M., (1977, p.193) Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al, (1978, p.45-98) Iceberg thickness profiling. Kovaca, A., (1978, p.766-774) MP 1619 Destruction of ice islands with explosives. Mellor, M., et al, (1978, p.753-765) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an assessment. Weeks, W.F., et al, (1979, p.320-337) Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, (1980, 468p.) MP 1674 Iceberg hickness rofiling lakes observed by radar. Weeks, W.F., et al, (1981, 17p.) Iceberg hickness rofiling lakes Ice-covered North Slope lakes observed by radar. Weeks, W.F., et al, (1981, 17p.) Iceberg hickness rofiling. K.P., et al, (1986, p.467-481) Iceberg hickness rofiling. Rovered by radar. Weeks, W.F., et al, (1986, p.467-481)	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704] Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p.] Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.] Cost of ice damage to shoreline structures during navigation. SR 89-22 Impact thus performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., [1980, p.801-823] Ship resistance in thick brash ice. Mellor, M., [1980, p.305-321] Ice force measurement on the Yukon River bridge. McPadden, T., et al., [1981, p.749-777] Messurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Ice penetration tests. Garcia, N.B., et al., [1985, p.223-236) Impact toes Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179) Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., [1980, 13p.] Dynamic testing of free field stress gages in frozen soil. Aikten, G.W., et al., [1980, 26p.) Impactities
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126], MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15, MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.B., [1980, 26p.] Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.) Thermal patterns in ice under dynamic loading. Fish, A.M., et al., (1983, p.240-243) Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ite volume Ground ice in perennially frozen sediments, northern Alsaka. Lawson, D.B., (1973, 157p.) MP 1742 Preliminary investigation of the underside of river ice covers. Ashton, G.D., (1971, 157p.) Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] Effect of the coesanic boundary layer on the mean drift of pack is an increase of the seasonal sea ice. 200e. MP 1394 Turbulent heat transfer from a river to its ice cover. Haynes, E.D., et al., [1979, 5p.] Physical ocesnography of the seasonal sea ice. 200e. McPhee, M.G., [1979, 1979,	Some elements of iceberg technology. Weeks, W.F., et al., (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., (1979, p.66-75) Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water from icebergs. Mellor, M., (1977, p.193) MP 1126 Obtaining fresh water from icebergs. Mellor, M., (1977, p.193) Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al., (1978, p.753-765) Iceberg thickness profiling. Kovaca, A., (1978, p.766-774) MP 1616 Iceberg thickness profiling. Kovaca, A., (1978, p.766-774) MP 1619 Destruction of ice islands with explosives. Mellor, M., et al., (1978, p.753-765) Icebergs: an overview. Kovaca, A., (1979, 7p.) Overview on the seasonal sea ice zone. Weeks, W.F., et al., (1979, p.320-337) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Dynamics of snow and ice masses. Colbeck, S.C., ed., (1980, 468p.) McChanical properties of ice in the Arctic seas. Weeks, W.F., et al., (1984, p.235-259) McChanical properties of ice in the Arctic seas. Weeks, W.F., et al., (1981, 17p.) Icebeand lakes Icebergs transport of the state of the properties of ice in the Arctic seas. Weeks, W.F., et al., (1981, 17p.) Icebeand rivers St. Lawrence River freeze-up forecast. Foltyn, B.P., et al., (1986, p.467-481) Icebeand rivers St. Lawrence River freeze-up forecast. Foltyn, B.P., et al., (1986, p.467-481)	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p.] Ice and ship effects on the St. Marys River ice booma. Per- ham, R.E., [1978, p.222-230] MP 1617 Ice forces on the Yukon River bridge—1978 breakup. John- son, P.R., et al., [1979, 40p.] Cost of ice damage to shoreline structures during navigation. Carey, K.L., [1980, 33p.] Impact thus performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Rich- mond, P.W., [1980, p.801-823] Ship resistance in thick brash ice. Mellor, M., [1980, p.305- 321] Ice force measurement on the Yukon River bridge. MP 1329 Ice force measurement on the Yukon River bridge. MP 1329 Messurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) Mechanics of ice cover breakthrough. Kert, A.D., [1984, p.245-262] Impact toe force and pressure: An experimental study with urea ice. Sodhi, D.S., et al., [1986, p.569-576] MP 2837 Inspect tests Report of the ITTC panel on testing in ice, 1978. Pranken- stein, G.E., et al., [1978, p.157-179] Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., [1980, 26p.) Impactities Apparent anomaly in freezing of ordinary water. Swinzow, C.R. 76-20 Vanadium and other elements in Greenland ice cores. Her-
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.17-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III., [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M. P1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] Ice water interface Pormation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] RP 1443 Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p.388-400] Turbulent heat transfer from a river to its ice cover. Ryp., et al., [1979, 5p.] Physical oceanography of the seasonal sea ice zone. Weeks, W.F., [1980, p.1-35] MP 1293 Modeling of anisotropic electromagnetic reflection from sea ice. Golden, K.M., et al., [1980, p.247-294] MP 1325	Some elements of iceberg technology. Weeks, W.F., et al., [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al., [1979, p.66-75] Power requirements and methods for long distance large iceberg towing. Melior, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Icebergs Towing icebergs. Lonadale, H.K., et al., [1974, p.2] MP 1345 Icebergs Towing icebergs. Lonadale, H.K., et al., [1974, p.2] MP 1280 Obtaining fresh water from icebergs. Mellor, M., (1977, p.193) Iceberg thickness profiling using an impulse radar. Kovaca, A., [1977, p.140-142] Iceberg thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al., [1978, p.45-98] Iceberg thickness profiling. Kovaca, A., [1978, p.766-714] Iceberg thickness profiling. Kovaca, A., [1978, p.753-765] ICEBERG TOWN OF THE STANDARD OF TH	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booma. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carey, K.L., (1980, 33p.) Impact fuse performance in snow (initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1849 Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) MP 1849 Messurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Impact ice force and pressure: An experimental study with ures ice. Sodhi, D.S., et al., (1985, p.23-236) Impact teets Report of the ITTC panel on testing in ice, 1978. Frankentein, G.E., et al., (1980, 13p.) Dynamic testing of free field stress gages in frozen soil. Aitken, G.W., et al., (1980, 13p.) Dynamic testing of free field stress gages in frozen soil. Aitken, G.W., et al., (1980, 25p.) Vanadium and other elements in Greenland ice cores. Herzon, M.M., et al., (1976, 4p.) CR 76-24
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1009 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] MP 1065 Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p-] Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III, [1980, 35p-] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p-] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p-] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1783 Ice volume Ground ice in perennially frozen sediments, northern Alaska, W.F., et al., [1977, p.129-136] Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] Experimental scaling study of an annular flow ice-water best sink. Stubstad, J.M., et al., [1977, 54p.] CR 77-15 Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p. j.38-400] Turbulent heat transfer from a river to its ice covert. Hayses, E.D., et al., [1979, 5p.] CR 79-13 Physical oceanography of the seasonal sea ice zone. McPhee, M.G., [1979, p. j.38-400] MP 1234 Problema of the seasonal sea ice zone. Weeks, W.F., [1980, p.1-35] Modeling of anisotropic electromagnetic reflection from sea ice. Golden, K.M., et al., [1980, p.247-294] MP 1325 Nonsteady ice drift in the Strait of Belle lale. Sodhi, D.S.,	Some elements of iceberg technology. Weeks, W.F., et al, (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, (1979, p.56-75) MP 1365 Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water from icebergs. Mellor, M., (1977, p.193) MP 1127 Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Iceberg thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al, (1978, p.753-765) Iceberg thickness profiling. Kovaca, A., (1978, p.766-774, MP 1619 Destruction of ice islands with explosives. Mellor, M., et al, (1978, p.753-765) Coverview on the seasonal sea ice zone. Weeks, W.F., et al, (1979, p.320-337) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Destruction of snow and ice masses. Colbeck, S.C., ed, (1980, 468p.) MP 1360 Dynamics of snow and ice masses. Colbeck, S.C., ed, (1980, 468p.) Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, (1984, p.235-259) Iceberg water: an assessment. St. Lawrence River freeze-up forecast. Foltyn, B.P., et al, (1986, p.467-481) Icebergkers Iceberakers Iceberake	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kowaca, A., et al., [1977, 39p.] Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.] Cost of ice damage to shoreline structures during navigation. SR 99-22 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., [1980, p.801-823] Ship resistance in thick brash ice. Mellor, M., [1980, p.305-321] Ice force measurement on the Yukon River bridge. McPadden, T., et al., [1981, p.749-777] MP 1329 Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) Mechanics of ice cover breakthrough. Kerr, A.D., (1984, p.245-262) Ice penetration tests. Garcia, N.B., et al., [1985, p.223-236) Impact tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., (1978, p.157-179) Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., (1980, 13p.) Dynamic testing of free field stress gages in frozen soil. Aithen, G.W., et al., [1980, 26p.) Impactities Apparent anomaly in freezing of ordinary water. CR 76-24 Vanadium and other elements in Greenland ice cores. Hercu, M.M., et al., (1976, 25p.) Photomarcorgraphy of artifacts in transparent
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1002 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibber, W.D., III, [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1785 Ice water interface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] MP 243 Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] MP 1243 Rafect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p.384-400] Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., [1979, 5p.] MP 1283 Modelling of anisotropic electromagnetic reflection from sea ice. Golden, K.M., et al., [1980, p.247-294] Nonsteady ice drift in the Strait of Belle Isle. Sodhi, D.S., et al., [1980, p.177-186] MP 1354	Some elements of iceberg technology. Weeks, W.F., et al. (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. (1979, p.66-75) Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water from icebergs. Mellor, M., (1977, p.193) MP 1117 Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Power thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al. (1978, p.45-98) Iceberg thickness profiling. Kovaca, A., (1978, p.766-774) MP 1616 Iceberg thickness profiling. Kovaca, A., (1978, p.766-774) MP 1619 Destruction of ice islands with explosives. Mellor, M., et al. (1978, p.753-765) Icebergs: an overview. Kovaca, A., (1979, 7p.) Overview on the seasonal sea ice zone. Weeks, W.F., et al. (1979, p.320-337) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, 39p.] Ice and ship effects on the St. Marys River ice booms. Perham, R.E., [1978, p.222-230] MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.] Cost of ice damage to shoreline structures during navigation. SR 89-22 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., [1980, p.801-823] Ise force measurement on the Yukon River bridge. MP 1349 Ship resistance in thick brash ice. Mellor, M., [1980, p.305-321] Ice force measurement on the Yukon River bridge. McFadden, T., et al., [1981, p.749-777] Messurement of ice forces on structures. Sodhi, D.S., et al., [1983, p.139-155] Mechanics of ice cover breakthrough. Kerr, A.D., [1984, p.245-262] Impact ice force and pressure: An experimental study with urea ice. Sodhi, D.S., et al., [1986, p.569-576] MP 2837 Impact tests Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., [1978, p.157-179] Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., [1980, 26p.) Practure behavior of ice field stress gages in frozen soil. Aikten, G.W., et al., [1976, 35p.) Dynamic testing of free field stress gages in frozen soil. Aikten, G.W., et al., [1976, 4p.) Photomacrography of artifacts in transparent Marshall, S.J.,, [1976, 31p.] Protomacrography of artifacts in transparent Marshall, S.J.,, [1976, 31p.]
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.17-126] MP 1002 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibler, W.D., III., [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M. P1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] MP 1783 Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.B., [1983, p.695-700] Ice water taterface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] MP 1243 Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al., [1977, 54p.] CR 77-13 Effect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p.388-400] Turbulent heat transfer from a river to its ice cover. Hypses, GR 79-13 Physical oceanography of the seasonal sea ice zone. McPhee, M.G., [1979, p.3132] Problema of the seasonal sea ice zone. Weeks, W.F., [1980, p.1-35] MP 1234 Nonsteady ice drift in the Strait of Belle lale. Sodhi, D.S., et al., [1980, p.17-7186] Pree convection heat transfer characteristics in a melt water	Some elements of iceberg technology. Weeks, W.F., et al, [1978, 31p.] Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al, [1979, p.66-75] MP 1385 Power requirements and methods for long distance large iceberg towing. Mellor, M., [1980, p.231-240] MP 1275 Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] Icebergs Towing icebergs. Lonsdale, H.K., et al, [1974, p.2] MP 1365 Icebergs Towing icebergs. Lonsdale, H.K., et al, [1974, p.2] MP 1126 Obtaining fresh water from icebergs. Mellor, M., [1977, p.193] Iceberg thickness profiling using an impulse radar. Kovaca, A., [1977, p.140-142] Iceberg thickness and crack detection. Kovaca, A., [1978, p.131-145] Some elements of iceberg technology. Weeks, W.F., et al, [1978, p.45-98] Iceberg thickness profiling. Kovaca, A., [1978, p.766-774, MP 1616 Destruction of ice islands with explosives. Mellor, M., et al, [1979, p.320-337] Icebergs: an overview. Kovaca, A., [1979, 7p.] Overview on the seasonal ses ice zone. Weeks, W.F., et al, [1979, p.320-337] Iceberg water: an assessment. Weeks, W.F., [1980, p.5-10] MP 1345 Dynamics of snow and ice masses. Colbeck, S.C., ed, [1980, 468p.] Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, [1984, p.235-259] Mechanical properties of ice in the Arctic seas. Weeks, W.F., et al, [1984, p.235-259] Icebergal Rivers St. Lawrence River freeze-up forecast. Foltyn, B.P., et al, [1986, p.467-481] Icebergaliang concepts. Mellor, M., [1980, 18p.]	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) Brazil tensile strength tests on see ice: a data report. Kovaca, A., et al., (1977, 39p.) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) Ice and ship effects on the St. Marys River ice booms. Perham, R.E., (1978, p.222-230) MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., (1979, 40p.) Cost of ice damage to shoreline structures during navigation. Carry, K.L., (1980, 33p.) Cost of ice damage to shoreline structures during navigation. SR 89-22 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45) MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., (1980, p.801-823) MP 1349 Ship resistance in thick brash ice. Mellor, M., (1980, p.305-321) Ice force measurement on the Yukon River bridge. McPadden, T., et al., (1981, p.749-777) Measurement of ice forces on structures. Sodhi, D.S., et al., (1983, p.139-155) MP 1349 Mechanics of ice cover breakthrough. Kert, A.D., (1984, MP 1997) Ice penetration tests. Garcia, N.B., et al., (1985, p.223-236) Impact tests Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., (1976, p.157-179) MP 2837 Impact tests Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., (1976, p.157-179) Dynamic testing of free field stress gages in frozen soil. Aikten, C.W., et al., (1980, 13p.) CR 76-20 Vanadium and other elements in Greenland ice cores. Herror, M.M., et al., (1976, 4p.) Photomacrography of artifacts in transparent marchall, S.J., (1976, 4p.) Photomacrography of artifacts in transparent materials. Marshall, S.J., (1976, 31p.) Composition of vapors evolved from military TNT.
G.F.N., et al., [1986, p.135-142] Ice thermal properties Influence of irregularities of the bed of an ice sheet on deposition rate of till. Nobles, L.H., et al., [1971, p.117-126] MP 1002 River ice problems. Burgi, P.H., et al., [1974, p.1-15] MP 1002 Engineering properties of sea ice. Schwarz, J., et al., [1977, p.499-531] Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 80-02 Documentation for a two-level dynamic thermodynamic sea ice model. Hibber, W.D., III, [1980, 35p.] Review of thermal properties of snow, ice and sea ice. Yen, YC., [1981, 27p.] Growth, structure, and properties of sea ice. Weeks, W.F., et al., [1982, 130p.] Thermal patterns in ice under dynamic loading. Fish, A.M., et al., [1983, p.240-243] MP 1742 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] Ice volume Ground ice in perennially frozen sediments, northern Alaska. Lawson, D.E., [1983, p.695-700] MP 1785 Ice water interface Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] MP 243 Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., [1977, p.129-136] MP 1243 Rafect of the oceanic boundary layer on the mean drift of pack ice: application of a simple model. McPhee, M.G., [1979, p.384-400] Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., [1979, 5p.] MP 1283 Modelling of anisotropic electromagnetic reflection from sea ice. Golden, K.M., et al., [1980, p.247-294] Nonsteady ice drift in the Strait of Belle Isle. Sodhi, D.S., et al., [1980, p.177-186] MP 1354	Some elements of iceberg technology. Weeks, W.F., et al. (1978, 31p.) Prospects for towing icebergs from the Southern Ocean. Weeks, W.F., et al. (1979, p.66-75) Power requirements and methods for long distance large iceberg towing. Mellor, M., (1980, p.231-240) MP 1275 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) Iceberg water from icebergs. Mellor, M., (1977, p.193) MP 1117 Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) Power thickness and crack detection. Kovaca, A., (1978, p.131-145) Some elements of iceberg technology. Weeks, W.F., et al. (1978, p.45-98) Iceberg thickness profiling. Kovaca, A., (1978, p.766-774) MP 1616 Iceberg thickness profiling. Kovaca, A., (1978, p.766-774) MP 1619 Destruction of ice islands with explosives. Mellor, M., et al. (1978, p.753-765) Icebergs: an overview. Kovaca, A., (1979, 7p.) Overview on the seasonal sea ice zone. Weeks, W.F., et al. (1979, p.320-337) Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an assessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-10) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks, W.F., (1980, p.5-110) MP 1320 Iceberg water: an issuessment. Weeks	Impact of spheres on ice. Closure. Yen, YC., et al., [1972, p.473] Impact strength Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, p.693-704] Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., [1977, 39p.] Ice and ship effects on the St. Marys River ice booms. Perham, R.E., [1978, p.222-230] MP 1617 Ice forces on the Yukon River bridge—1978 breakup. Johnson, P.R., et al., [1979, 40p.] Cost of ice damage to shoreline structures during navigation. SR 89-22 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., [1980, p.31-45] MP 1347 Small caliber projectile penetration in frozen soil. Richmond, P.W., [1980, p.801-823] Ise force measurement on the Yukon River bridge. MP 1349 Ship resistance in thick brash ice. Mellor, M., [1980, p.305-321] Ice force measurement on the Yukon River bridge. McFadden, T., et al., [1981, p.749-777] Messurement of ice forces on structures. Sodhi, D.S., et al., [1983, p.139-155] Mechanics of ice cover breakthrough. Kerr, A.D., [1984, p.245-262] Impact ice force and pressure: An experimental study with urea ice. Sodhi, D.S., et al., [1986, p.569-576] MP 2837 Impact tests Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., [1978, p.157-179] Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., [1980, 26p.) Practure behavior of ice field stress gages in frozen soil. Aikten, G.W., et al., [1976, 35p.) Dynamic testing of free field stress gages in frozen soil. Aikten, G.W., et al., [1976, 4p.) Photomacrography of artifacts in transparent Marshall, S.J.,, [1976, 31p.] Protomacrography of artifacts in transparent Marshall, S.J.,, [1976, 31p.]

P. 4. 4 . 44 . 5	CORPUT COMMISSION OF BOARD AND MANAGE COMM	Carrier of an and an advantage of an advantage by an analysis and
Indexes (ratios) Axial double point-load tests on snow and ice. Kovacs, A., [1978, 11p.] CR 78-01	CRREL roof moisture survey, Pease APB. Korhonen, C., et al, [1977, 10p.] SR 77-02 Installation of loose-laid inverted roof system at Port Wain-	Seasonal growth and uptake of nutrients by orchardgrass irrigated with wastewater. Palazzo, A.J., et al, [1981, 19p.] CR 81-68
Environmental atles of Alaska. Hartman, C.W., et al., (1978, 95p.)	wright, Alaska. Schaefer, D., [1977, 27p.] SR 77-18 Infrared detective: thermograms and roof moisture. Korhonen, C., et al, [1977, p.41-44] MIP 961	Misgivings on isostatic imbalance as a mechanism for sea ice cracking. Ackley, S.F., et al., [1976, p.85-94]
Plant recovery from Arctic oil spills. Walker, D.A., et al, [1978, p.242-259] MP 1184 Indicating instruments	Construction of temporary sirfields in NPRA. Crory, F.E., (1978, p.13-15) MP 1253	MP 1379
Photoelastic instrumentation—principles and techniques. Roberts, A., et al, [1979, 153p.] SR 73-13	Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] SR 78-24	Greenland climate changes shown by ice core. Danagaard, W., et al. (1971, p.17-22) MP 998
Inflatable structures Laboratory experiments on lock wall deloing using pneumatic	Roof moisture survey—U.S. Military Academy. Korhonen, C., et al, [1979, 8 refs.] SR 79-16	Oxygen isotope profiles through ice sheets. Johnsen, S.J., et al, [1972, p.429-434] MP 997
devices. Itagaki, K., et al, [1977, p.53-68] MP 974 Lock wall descing. Hanamoto, B., [1977, p.7-14]	Roofs in cold regions. Tobiasson, W., [1980, 21p.]	C-14 and other isotope studies on natural ice. Oeschger, H., et al., [1972, p.D70-D92] MP 1652 Stable isotope profile through the Ross Ice Shelf at Little
Infrared equipment	Locating wet cellular plastic insulation in recently constructed roofs. Korhonen, C., et al., [1983, p.168-173] MP 1729	America V, Antarctica. Danagaard, W., et al., (1977, p.322-325) MP 1095
Detecting structural heat losses with mobile infrared thermography, Part IV. Munis, R.H., et al., [1976, 9p.]	Protected membrane roofing systems. Tobisseon, W., 1986, p.49-50, MP 2148	Methodology for nitrogen isotope analysis at CRREL. Jen- kins, T.P., et al, [1978, 57p.] SR 78-86
CRRBL roof moisture survey, Pease AFB. Korhonea, C., et al, [1977, 10p.] SE 77-92	Interfaces CRREL instrumented vehicle for cold regions mobility mess-	20-yr cycle in Greenland ice core records. Hibler, W.D., III, et al., [1979, p.481-483] MP 1245
Infrared detective: thermograms and roof moisture. Korhonen, C., et al, [1977, p.41-44] MP 961	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 On the rheology of a broken ice field due to flor collision.	Method for measuring enriched levels of deuterium in soil
Roof moisture survey—U.S. Military Academy. Korhonen, C., et al. [1979, 8 refs.] SR 79-16	Shen, H., et al, [1984, p.29-34] MP 1812 Internal friction	water. Oliphant, J.L., et al. [1982, 12p.] SR 82-25. Deuterium diffusion in a soil-water-ice mixture. Oliphant, J.L., et al. [1984, 11p.] SR 84-27.
Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] SR 83-22	Effect of X-ray irradiation on internal friction and dielectric relaxation of ice. Itagaki, K., et al., [1983, p.4314-4317, MP 1670	Isotopic inheling Guide to the use of 14N and 15N in environmental research.
Land use and water quality relationships, eastern Wisconsin. Haugen, R.K., et al., 1976, 47p.; CR 76-30	International cooperation	Edwards, A.P., [1978, 77p.] SR 78-18 Laboratories
Infrared thermography of buildings. Munis, R.H., et al, [1977, 17p.] SE 77-29	High-latitude basins as settings for circumpolar environmen- tal studies. Slaughter, C.W., et al, [1975, p.IV/57- IV/68] MIP 917	Research activities of U.S. Army Cold Regions Research and Engineering Laboratory. Buzzell, T.D., [1975, p.9-12]
Infrared thermography of buildings. Munis, R.H., et al. SE 77-26	Scientists visit Kolyma Water Balance Station in the USSR. Slaughter, C.W., et al, [1977, 66p.] SR 77-15	Cold Regions Research and Engineering Laboratory. Preitag, D.R., 1978, p.4-6; MP 1251
Roof moisture survey: ten State of New Hampahire buildings. Tobiasson, W., et al, [1977, 29p.] Inundation of vegetation in New England. McKim, H.L., et	Subarctic watershed research in the Soviet Union. Slaughter, C.W., et al. (1978, p.305-313) MP 1273	Mercury contamination of water samples. Cragin, J.H., [1979, p.313-319]
al, [1978, 13p.] MIP 1169 Detecting wet roof insulation with a hand-held infrared cam-	International and national developments in land treatment of wastewater. McKim, H.L., et al. [1979, 28p.] MP 1420	Ice engineering facility. Zabilansky, L.J., et al, (1983, 12p. + fig.) MP 2088
era. Korhonen, C., et al, [1978, p.A9-A15] MP 1213	Interstitial water Chemistry of interstitial water from subsea permatrost.	Data acquisition in USACRREL's flume facility. Daly, S.F., et al, r1985, p.1053-1058; MIP 2889
Infrared thermography of buildings: 1977 Coast Guard survey. Marshall, S.J., [1979, 40p.] SR 79-20	Prudhoe Bay, Alaska. Iskandar, I.K., et al, [1978, p.92-98] MIF 1385	Laboratory techniques Loc forces on model structures. Zabilansky, L.J., et al.,
Roof moisture surveys. Tobiasson, W., [1982, p.163-166] MP 1505 Infrared inspection of new roofs. Korhonen, C., [1982,	Ion density (concentration) Chemical composition of haul road dust and vegetation. Is-	[1975, p.400-407] MP 863 Apparent anomaly in freezing of ordinary water. Swinzow, G.K., [1976, 23p.] CR 76-20
14p. ₁ SR 82-33 Comparison of serial to on-the-roof infrared moisture surveys.	kandar, I.K., et al, (1978, p.110-111) MP 1116 Ion diffusion	Laboratory studies of compressed air seeding of supercooled fog. Hicks, J.R., et al, [1977, 19p.] SR 77-12
Korhonen, C., et al. [1983, p.95-105] MP 1709 Thermal emittance of diathermanous materials. Munis,	Ionic migration and weathering in frozen Antarctic soils. Ugolini, F.C., et al., [1973, p.461-470] MP 941 Ion exchange	Laboratory experiments on lock wall deicing using pneumatic devices. Itagaki, K., et al. (1977, p.53-681 MP 974
R.H., et al, (1984, p.209-220) MP 1863 Time-lapse thermography: a unique electronic imaging ap-	Prototype wastewater land treatment system. Jenkins, T.F., et al., [1979, 91p.] SR 79-35	Resiliency in cyclically frozen and thawed subgrade soils. Chamberlain, B.J., et al., [1977, p.229-281] MP 1724
plication. Marshall, S.J., et al, (1984, p.84-88) MP 2103 Aerial roof moisture surveys. Tobiasson, W., (1985, p.424-	Ions Ion and moisture migration and frost heave in freezing Morin	Laboratory experiments on icing of rotating blades. Ackley, S.P., et al., (1979, p.85-92). MP 1236
425 ₁ MP 2022 Thermal emissivity of disthermanous materials. Munis,	clay. Qiu, G., et al, [1986, p.1014] MP 1970 Irrigation	Kinetics of denitrification in land treatment of wastewater. Jacobson, S., et al. [1979, 59p.] Preparation of polycrystalline ice specimens for laboratory
R.H., et al, (1985, p.872-878) MP 1963 Infrared radiation	Land treatment of wastewaters for rural communities. Reed, S.C., et al, [1975, p.23-39] MP 1399	experiments. Cole, D.M., (1979, p.153-159) MP 1327
Infrared thermography of buildings: an annotated bibliography. Marshall, S.J., [1977, 21p.] SR 77-09	Land treatment of wastewater. Murrmann, R.P., et al. (1976, 36p.) MP 920	Lacustrine deposits Phosphorus chemistry of sediments of Lake Koocanuse, Mon-
CRRBL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] SR 77-43	Land application of wastewater in permafrost areas. Sletten, R.S., p1978, p. 911-917; MP 1119	tana. Iakandar, I.K., et al, (1981, 9p.) SR 81-15 Leke ice
Infrared thermography of buildings—a bibliography with abstracts. Marahall, S.J., (1979, 67p.) SR 79-01 Snow chemistry of obscurants released during SNOW-	Microbiological aerosols during wastewater irrigation. Bau- sum, H.T., et al, (1978, p.273-280) MP 1154 Uptake of nutrients by plants irrigated with wastewater.	loe-cratering experiments Blair Lake, Alaska. Kurtz, M.K., et al., (1966, Various pagings) MP 1634
TWO/Smoke Week VI. Cragin, J.H., 11984, p.409-416, MP 1873	Clapp, C.B., et al., 1978, p.395-404; MP 1151 Mass water balance during spray irrigation with wastewater at	Growth and mechanical properties of river and lake icc. Ramseier, R.O., [1972, 243p.] MF 1883 Winter thermal structure and ice conditions on Lake Cham-
Ice fog as an electro-optical obscurant. Koh, G., r1985, 11p.; CR 85-68	Deer Creek Lake land treatment site. Abele, G., et al, [1978, 43p.] SR 79-29	plain, Vermont. Bates, R.B., [1976, 22p.] CR 76-13 Structural growth of lake ice. Gow, A.J., et al., [1977, 24p.]
Wavelength-dependent extinction by falling snow. Koh, G., (1986, p.51-55) MP 2019 Infrared reconnected	Experimental system for land renovation of effluent. Nylund, J.R., et al, [1978, 26p.] SR 78-23	Radar imagery of ice covered North Slope lakes. Weeks,
Hand-held infrared systems for detecting roof moisture. Tobiasson, W., et al, [1977, p.261-271] MP 1390	Freezing problems with wintertime wastewater spray irriga- tion. Bouzoun, J.R., r1979, 12p., SR 79-12	W.F., et al, (1977, p.129-136) MP 923 Flexural strength of ice on temperate lakes. Gow, A.J.,
Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] SR 78-01	International and national developments in land treatment of wastewater. McKim, H.L., et al, [1979, 28p.] MP 1420	(1977, p.247-256) WF 1963 Visual observations of floating ice from Skylab. Campbell, W.J., et al, (1977, p.353-379) MP 1263
Thermal observations of Mt. St. Helens before and during eruption. St. Lawrence, W.F., et al, [1980, p.1526-1527]	Bacterial aerosols resulting from wastewater irrigation in Ohio. Bausum, H.T., et sl. (1979, 64p.) SR 79-32	Flexural strength of ice on temperate lakes. Gow, A.J., et al., [1978, 14p.]
Roof moisture surveys: current state of the technology. Tobiasson, W., [1983, p.24-31] MP 1628	Nitrogen transformations in land treatment. Jenkins, T.F., et al, [1979, 32p.] SR 79-31	Remote detection of water under ice-covered lakes on the North Slope of Alaska. Kovacs, A., 1978, p.448-458;
Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., (1983, p.267-272) MP 1760	Land treatment of waste water in cold climates. Jenkins, T.F., et al, [1979, p.207-214] MP 1279	MP 1214 Forecasting ice formation and breakup on Lake Champlain. Bates, R.B., et al. r1979, 210-1 CR 79-26
Infrared spectroscopy Red and near-infrared spectral reflectance of snow. O'Brien,	Prototype wastewater land treatment system. Jenkins, T.F., et al, [1979, 91p.] Wastewater treatment in cold regions by overland flow.	Bates, R.B., et al, 1979, 21p.; Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.B., 1980, 26p.; CR 89-92
H.W., et al, (1975, p.345-360) MP 872 Research on roof moisture detection. Tobiasson, W., et al,		
	Martel, C.J., et al, [1980, 14p.] CR 80-07	Maximum thickness and subsequent decay of lake, river and fast see ice in Canada and Alaska. Bilello, M.A., (1980,
[1978, 6p.] SR 78-29	Martel, C.J., et al., [1980, 14p.] CR 80-67 Dynamics of NH4 and NO3 in cropped soils irrigated with wastewater. Iskandsr, I.K., et al., [1980, 20p.] SR 80-27	fast ses ice in Canada and Alaska. Bilello, M.A., [1980, 160p.] CR 88-06 Preshwater ice growth, motion, and decay. Ashton, G.D.,
[1978, 6p.] SR 78-29 Roof moisture survey. Korhonen, C., et al, [1980, 31p.] SR 86-14 Problems in anow cover characterization. O'Brien, H.W.,	Martel, C.J., et al., [1980, 14p.] Ornamics of NH4 and NO3 in cropped soils irrigated with wastewater. Iskandar, I.K., et al., [1980, 20p.] SR 80-27 Forage grass growth on overland flow systems. A.J., et al., [1980, p.347-354] MP 1402	fast sea ice in Canada and Alaska. Bilello, M.A., 1980, 160p., CR 80-06 Preshwater ice growth, motion, and decay. Ashton, G.D., 1980, p.261-304, MP 1239 Ice formation and breakup on Lake Champlain. Bates, R.E.,
[1978, 6p.] SR 78-29 Roof moisture survey. Korhonen, C., et al, [1980, 31p.] SR 88-14 Problems in snow cover characterization. O'Brien, H.W., [1982, p.139-147] MP 1987 Instruments	Martel, C.J., et al, [1980, 14p.] Dynamics of NH4 and NO3 in cropped soils irrigated with wastewater. Iskandar, I.K., et al, [1980, 20p.] SR 80-27 Forage grass growth on overland flow systems. Palaszo, A.J., et al, [1980, p.347-354] Effectiveness of land application for P removal from waste water. Iskandar, I.K., et al, [1980, p.516-621]	fast sea ice in Canada and Alsaka. Bilello, M.A., [1980, CR 88-66] Freshwater ice growth, motion, and decay. Ashton, G.D., [1980, p.261-304] Ice formation and breakup on Lake Champlain. Bates, R.B., [1980, p.125-143] Method for measuring brash ice thickness with impulse radar.
[1978, 6p.] SR 78-29 Roof moisture survey. Korhonen, C., et al, [1980, 31p.] SR 88-14 Problems in snow cover characterization. O'Brien, H.W., [1982, p.139-147] MP 1987	Martel, C.J., et al, 1980, 14p.; CR 89-67 Dynamics of NH4 and NO3 in cropped soils irrigated with wastewater. Iskandar, I.K., et al, (1980, 20p.; SR 80-27 Forage grass growth on overland flow systems. Palazzo, A.J., et al, (1980, p.347-354) MP 1402 Effectiveness of land application for P removal from waste water. Iskandar, I.K., et al, (1980, p.516-621) MP 1444 Seasonal growth and accumulation of N. P. and K by grass	fast sea ice in Canada and Alsaka. Bilello, M.A., [1980, 160p.] Preshwater ice growth, motion, and decay. Ashton, G.D., [1980, p.261-304] Ice formation and breakup on Lake Champlain. [1980, p.125-143] MP 1429 MP 1429
[1978, 6p.] SR 78-29 Roof moisture survey. Korhonen, C., et al, [1980, 31p.] SR 58-14 Problems in snow cover characterization. [1982, p.139-147] Instruments Instruments in the Arctic. Atkins, R.T., [1972, p.183-188] MP 990	Martel, C.J., et al, [1980, 14p.] CR 89-67 Dynamics of NH4 and NO3 in cropped soils irrigated with wastewater. Iskandar, I.K., et al, [1980, 20p.] SR 80-27 Forage grass growth on overland flow systems. A.J., et al, [1980, p.347-354) Effectiveness of land application for P removal from waste water. Iskandar, I.K., et al, [1980, p.616-621] MP 1444	fast ses ice in Canada and Alsaka. Bilello, M.A., [1980, 160p.] Freshwater ice growth, motion, and decay. Ashton, G.D., [1980, p.261-304] MP 1239 Ice formation and breakup on Lake Champlain. MP 1429 Method for measuring brash ice thickness with impulse radar. MRTinson, C.R., et al, [1981, 10p.] SR 81-11 Ice-covered North Slope lakes observed by radar. Weeks,

Model study of Port Huron ice control structure; wind stress	Overland flow: removal of toxic volatile organics. Jenkins,	Leekase
simulation. Sodhi, D.S., et al, [1982, 27p.]	T.F., et al, [1981, 16p.] SR 81-01	Roof moisture survey-U.S. Military Academy. Korhonen,
Theory of thermal control and prevention of ice in rivers and	Seasonal growth and accumulation of N, P, and K by grass irrigated with wastes. Palazzo, A.J., [1981, p.64-68]	C., et al, [1979, 8 refs.] SR 79-16 Roof leaks in cold regions: school at Chevak, Alaska.
lakes. Ashton, G.D., [1982, p.131-185] MP 1554	MP 1425	Tobiasson, W., et al, [1980, 12p.] CR 88-11
Predicting lake ice decay. Ashton, G.D., [1983, 4p.]	Seasonal growth and uptake of nutrients by orchardgrass irrigated with wastewater. Palazzo, A.J., et al, [1981, 19p.]	Roof blister valve. Korhonen, C., [1986, p.29-31] MP 2138
Measurement of ice forces on structures. Sodhi, D.S., et al,	CR 81-06	Legislation
[1983, p.139-155] MP 1641 Lake ice decay. Ashton, G.D., [1983, p.83-86]	Seven-year performance of CRREL slow-rate land treatment prototypes. Jenkins, T.F., et al, [1981, 25p.]	Land treatment: present status, future prospects. Pound, C.E., et al, [1978, p.98-102] MP 1417
MP 1684	SR 81-12	EPA policy on land treatment and the Clean Water Act of
Quiet freezing of lakes and the concept of orientation textures in lake ice sheets. Gow, A.J., [1984, p.137-149]	Site selection methodology for the land treatment of wastewater. Ryan, J.R., et al, [1981, 74p.] SR 81-28	1977. Thomas, R.E., et al, [1980, p.452-460] MP 1418
MIP 1828	Model for prediction of nitrate leaching losses in soils. Meh-	Lichens
Flexural strengths of freshwater model ice. Gow, A.J., [1984, p.73-82] MP 1826	ran, M., et al, [1981, 24p.] CR 81-23	Tundra environment at Barrow, Alaska. Bunnell, F.L., et al,
Orientation textures in ice sheets of quietly frozen lakes.	Vegetation selection and management for overland flow sys- tems. Palazzo, A.J., et al, [1982, p.135-154]	(1975, p.73-124) MP 1050 Light scattering
Gow, A.J., [1986, p.247-258] MP 2118	MP 1511	Optical properties of salt ice. Lane, J.W., [1975, p.363-
Techniques for measurement of snow and ice on freshwater. Adams, W.P., et al, [1986, p.174-222] MP 2000	Overview of models used in land treatment of wastewater. Iskandar, I.K., [1982, 27p.] SR 82-01	372 ₁ MP 854 Snowpack optical properties in the infrared. Berger, R.H.,
Lake water	Wastewater treatment and plant growth. Palazzo, A.J.,	[1979, 16p.] CR 79-11
Correlation and quantification of airborne spectrometer data to turbidity measurements at Lake Powell, Utah. Merry,	[1982, 21p.] SR 82-65 Land treatment of wastewater. Reed, S.C., [1982, p.91-	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794
C.J., (1970, p.1309-1316) MP 1271	123 ₁ MP 1947	Forward-scattering corrected extinction by nonspherical par-
Remote detection of water under ice-covered lakes on the North Slope of Alaska. Kovacs, A., [1978, p.448-458]	User's index to CRREL land treatment computer programs and data files. Berggren, P.A., et al, (1982, 65p.)	ticles. Bohren, C.F., et al, [1984, p.261-271] MP 1870
MP 1214	SR 82-26	Forward-scattering corrected extinction by nonspherical par-
Case study: fresh water supply for Point Hope, Alaska. McFadden, T., et al, [1979, p.1029-1040] MP 1222	Case study of land treatment in a cold climate—West Dover, Vermont. Bouzoun, J.R., et al, [1982, 96p.]	ticles. Bohren, C.F., et al, [1985, p.1023-1029] MP 1958
Dissolved nitrogen and oxygen in lake water. Leggett, D.C.,	CR 82-44	Wavelength-dependent extinction by falling snow. Koh, G.,
[1979, 5p.] SR 79-24 Tundra lakes as a source of fresh water: Kipnuk, Alaska.	Assessment of the treatability of toxic organics by overland flow. Jenkins, T.F., et al., [1983, 47p.] CR 83-63	(1986, p.51-55) MP 2019 Light transmission
Bredthauer, S.R., et al, [1979, 16p.] SR 79-30	Corps of Engineers land treatment of wastewater research	Correlation and quantification of airborne spectrometer data
Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al, [1982, 184p.] SR 82-21	program: an annotated bibliography. Parker, L.V., et al, 1983, 82p., SR 83-09	to turbidity measurements at Lake Powell, Utah. Merry, C.J., [1970, p.1309-1316] MP 1271
Limnology of Lake Koocanusa, Montana. Storm, P.C., et al,	Model for land treatment planning, design and operation,	Water quality measurements at Lake Powell, Utah. Merry,
[1982, 597p.] SR 82-23	Pt.3. Baron, J.A., et al, [1983, 38p.] SR 83-98 Model for land treatment, Pt.1. Baron, J.A., et al, [1983,	C.J., [1977, 38p.] SR 77-28 Problems in snow cover characterization. O'Brien, H.W.,
Lake water intakes under icing conditions. Dean, A.M., Jr., [1983, 7p.] CR 83-15	35p. ₁ SR 83-86	[1982, p.139-147] MP 1987
Shoreline erosion processes: Orwell Lake, Minnesota. Reid, J.R., [1984, 101p.] CR 84-32	Model for land treatment planning, design and operation, Pt.2. Baron, J.A., et al, [1983, 30p.] SR 83-67	Falling snow characteristics and extinction. Berger, R.H., r1983, p.61-69; MP 1756
Lakes	Engineering systems for wastewater treatment. Lochr, R., et	Visible propagation in falling snow as a function of mass con-
Remote sensing for earth dam site selection and construction	al, [1983, p.409-417] MIP 1946	centration and crystal type. Lacombe, J., et al. [1983, p.103-111] MP 1757
materials. Merry, C.J., et al, [1980, p.158-170] MP 1316	Land treatment research and development program. Iskandar, I.K., et al, [1983, 144p.] CR 83-20	Performance and optical signature of an AN/VVS-1 laser
Land development	Land treatment processes. Me _{IT} y, C.J., et al, [1983, 79p.]	rangefinder in falling snow: Preliminary test results. La- combe, J., [1983, p.253-266] MP 1759
Urban waste as a source of heavy metals in land treatment. Iskandar, I.K., [1976, p.417-432] MP 977	SR 83-26 Nitrogen behavior in soils irrigated with liquid waste. Selim,	Wavelength-dependent extinction by falling snow. Koh, G.,
Land use and water quality relationships, eastern Wisconsin.	H.M., et al, [1984, p.96-108] MP 1762	[1986, p.51-55] MP 2019
Hausen, R.K., et al., 1976, 47n., CR 76-30		Light (visible radiation)
Haugen, R.K., et al., [1976, 47p.] CR 76-30 Symposium: geography of polar countries; selected papers	Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al, [1984, 36p.]	Polarization of skylight. Bohren, C., [1984, p.261-265]
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, [1977, 61p.]	toxic organics. Parker, L.V., et al, [1984, 36p.] CR 84-30	Polarization of skylight. Bohren, C., (1984, p.261-265) MP 1794
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, [1977, 61p.] SR 77-06 Effects of wastewater on the growth and chemical composi-	toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Toxic organics removal kinetics in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718]	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] CR 85-98
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, [1977, 61p.] SR 77-06	toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Toxic organics removal kinetics in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] MP 2111	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794] Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] CR 85-06 Limiting
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, [1977, 61p.] SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., [1977, p.171-180] MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R.,	toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Toxic organics removal kinetics in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718]	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794 Ice fog as an electro-optical obscurant. Koh. G., [1985, 11p.] CR 85-86 Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] MP 1696
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) MP 976	toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Toxic organics removal kinetics in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., [1980, 69p.] CR 80-14	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Laming Wastewater treatment in Alaska. Schneiter, R.W., et al,
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed, [1977, 61p.] SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., [1977, p.171-180] MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al, [1977, p.489-510] Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al, [1977, 34p.]	toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Toxic organics removal kinetics in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska.	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794 Ice fog as an electro-optical obscurant. Koh. G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] Restoration of scidic dredge soils with sewage sludge and time. Palazzo, A.J., [1983, 11p.] Liminology Liminology
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy,	toxic organics. Parker, L.V., et al., t[1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t[1985, p.707-718] MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t[1980, 69p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t[1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska.	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Limitsg Wastewater treatment in Alaska. Schneiter, R.W., et al, [1982, p.207-213] Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., [1977, 61p.] SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., [1977, p.171-180] MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., [1977, p.489-510] Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978. [1978, 2 vois.]	toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Toxic organics removal kinetics in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., [1980, 69p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] MP 2084	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794 Ice fog as an electro-optical obscurant. Koh. G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] Liminology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] Bavironmental analyses in the Kootenai River region, Mon-
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CREL, Aug.	toxic organics. Parker, L.V., et al., t[1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t[1985, p.707-718] MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t[1980, 69p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t[1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., t[1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al, [1982, p.207-213] Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] Liminology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] MP 1007
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Symposium on land treatment of wastewater, CREL, Aug. 1978. [1978, 2 vols.] MP 1145 Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., [1980, p.18-27] MP 1461	toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Toxic organics removal kinetics in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al., [1980, 69p.] Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] MP 2084 Periglacial landforms and processes, Kenai Mts., Alsaka. Bailey, P.K., [1985, 60p.] SR 85-03 LANDSAT	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794 Ice fog as an electro-optical obscurant. Koh. G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] Limnology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] Environmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., [1976, 53p.] SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., [1981, 9p.) SR 81-15
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Bsillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978. (1978, 2 vols.) Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) MP 1461 Land reclamation	toxic organics. Parker, L.V., et al., t 1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p.] Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211, MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et	Polarization of skylight. Bohren, C., [1984, p.261-265] MP 1794 Ice fog as an electro-optical obscurant. Koh. G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al, [1982, p.207-213] Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Limnology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] MP 1007 Bavironmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., [1976, 53p.] Phosphorus chemistry of sediments of Lake Koocanusa, Mon-
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., [1977, 61p.] SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., [1977, p.171-180] MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., [1977, p.489-510] Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978. [1978, 2 vols.] Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., [1980, p.18-27] Land reclamation Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., [1977, 116p.] SR 77-07	toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al., [1980, 69p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] MP 2084 Periglacial landforms and processes, Kenai Mts., Alsaka. Balley, P.K., [1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-211] MP 1055	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] Restoration of scidic dredge soils with sewage sudge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Liminology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] Environmental analyses in the Kootenais River region, Montana. McKim, H.L., et al., [1976, 53p.] SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., [1981, 9p.) Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] Limnology and primary productivity, Lake Koocanusa, Montana. Limnology and primary productivity, Lake Koocanusa, Montana.
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978. (1978, 2 vols.) Land loe Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) MP 1461 Land reclamation Bibliography of soil conservation activities in USSR perma-	toxic organics. Parker, L.V., et al., t 1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p.) CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p.) LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211, et al., t 1975, p.541-554, g. 1985, et al., t 1975, p.541-554, g. 1985, p. 1985, p. 1985, mp 1985, et al., t 1975, p.541-554, g. 1985, p. 1	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al, [1982, p.207-213] Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Limnology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] Britonmental analyses in the Kootenai River region, Montana. McKim, H.L., et al, [1976, 53p.] Bottom heat transfer to water bodies in winter. O'Neill, K., et al, [1981, 8p.] Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al, [1982, 106p.] SR 81-15 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al, [1982, 106p.] SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study.
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, (1978, 2 vols.) Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) Land reclamation Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., (1977, 116p.) SR 77-07 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547) MP 1268 Municipal sludge management: environmental factors.	toxic organics. Parker, L.V., et al., [1984, 36p.] CR 84-30 Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al., [1980, 69p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] MP 2084 Periglacial landforms and processes, Kenai Mts., Alsaka. Balley, P.K., [1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-211] MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., [1975, p.541-554] Sea ice drift and deformation from LANDSAT imagery. Hi-	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Liminology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] Environmental analyses in the Kootenais River region, Montana. McKim, H.L., et al., [1976, 53p.] SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Idkandar, I.K., et al., [1981, 9p.] SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 9p.] Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., [1982, 106p.] SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., [1982, 184p.] SR 82-21
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978. (1978, 2 vols.) Land tee Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) Land recatment of wastewater in USSR permafrost areas. Andrews, M., (1977, 116p.) SR 77-07 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) MP 1268	toxic organics. Parker, L.V., et al., t 1984, 36p., Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718, MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p., CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p., SR 85-03 LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211, MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., t 1975, p.541-554, Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., t 1976, p.115-135, MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p., SR 78-06 Landsat data collection platform, south central Alaska. Hau-	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al, [1982, p.207-213] MP 1696 Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Limnology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] MP 1007 Environmental analyses in the Kootenai River region, Montana. McKim, H.L., et al, [1976, 53p.] SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al, [1981, 9p.] SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K. et al, [1981, 8p.] SR 81-15 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al, [1982, 106p.] SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al, [1982, 184p.] Limnology of Lake Koocanusa, Montana. Storm, P.C., et al, [1982, 597p.] SR 82-23 SR 82-23
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., [1977, p.171-180] MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., [1977, p.489-510] MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, [1978, 2 vols.] Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., [1980, p.18-27] MP 1461 Land reclamation Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., [1977, 116p.] SR 77-07 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] Municipal sludge management: environmental factors. Reed, S.C., ed., [1977, Var. p.] Land treatment: present status, future prospects. Pound, C.E., et al., [1978, p.98-102] MP 1417	toxic organics. Parker, L.V., et al., t 1984, 36p., CR 84-30 Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718, MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p., CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p., SR 85-03 LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211, MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., t 1975, p.541-554, MP 349 Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., t 1976, p.115-135, MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p., SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., t 1979, 17 reth., SR 79-02	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Limnology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] Bavironmental analyses in the Kootenaia River region, Montana. McKim, H.L., et al., [1976, 53p.] SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. McKim, L.L., et al., [1981, 9p.) SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., [1982, 106p.] SR 82-21 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., [1981, 18p.] Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., [1982, 397p.] SR 82-23 Limnology, SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., [1982, 397p.]
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978. (1978, 2 vols.) Land tee Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) MP 1406 Land treatment: present status, future prospects. Pound, C.E., et al., (1978, p.98-102) MP 1417 Five-year performance of CRREL land treatment est cells.	toxic organics. Parker, L.V., et al., [1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., [1980, 69p.) CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., [1985, 60p.] SR 85-03 LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-21] NP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., [1975, p.541-554] Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., [1976, p.115-135] MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., [1978, 61p.] Landsat data collection platform, south central Alaska. Haugen, R.K., et al., [1979, 17 refs.] Mapping of the LANDSAT imagery of the Upper Sur 78-06 Mapping of the LANDSAT imagery of the Upper Sur 78-06 Mapping of the LANDSAT imagery of the Upper Sur 78-06 Mapping of the LANDSAT imagery of the Upper Sur 78-06	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al, [1982, p.207-213] MP 1696 Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Limnology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] MP 1007 Environmental analyses in the Kootenai River region, Montana. McKim, H.L., et al, [1976, 53p.] SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al, [1981, 9p.] SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K. et al, [1981, 8p.] SR 81-15 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al, [1982, 106p.] SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al, [1982, 184p.] Limnology of Lake Koocanusa, Montana. Storm, P.C., et al, [1982, 597p.] SR 82-23 SR 82-23
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, (1978, 2 vols.) MP 1145 Land ice Pianetary and extraplanetary event records in polar ice capazeller, E.J., et al., (1980, p.18-27) Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547) Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) Land treatment: present status, future prospects. Pound, C.E., et al., (1978, p.98-102) MP 1417 Five-year performance of CRREL land treatment test cella. Jenkins, T.F., et al., [1978, 24p.] Experimental system for land renovation of effluent. Ny-	toxic organics. Parker, L.V., et al., t 1984, 36p., CR 84-30 Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718, MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p., CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p., SR 85-03 LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211, MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., t 1975, p.541-554, MP 249 Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., t 1976, p.115-135, MP 1659 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p., SR 78-06 Landsat data collection platform, south central Alaska. Laugen, R.K., et al., t 1979, 17 reh., SR 79-02 Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al., t 1980, 41p., CR 80-64 Remote sensing of revegetation of burned tundra, Kokolik	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Limnology: a review. Hobbie, J.E., [1973, p.127-168] Ravironmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., [1976, 53p.] SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Mochana. Iskandar, I.K., et al., [1981, 9p.] Elimnology of Lake Koocanusa, Montana. Woods, P.F., et al., [1982, 106p.] SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., [1982, 106p.] SR 82-21 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., [1982, 397p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., [1982, 397p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., [1982, 397p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., [1982, 1979,] SR 82-23 Limnology of Greenland Ice Sheet Program. Phase 1: casing opera-
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978., (1978, 2 vols.) Land tee Planetary and extraplanetary event records in polar ice caps. Zelier, E.J., et al., (1980, p.18-27) MP 1461 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) MP 1406 Land treatment: present status, future prospects. Pound, C.E., et al., (1978, p.98-102) Five-year performance of CRREL land treatment test cells. Jenkins, T.F., et al., (1978, 24p.) SR 78-26 Experimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.)	toxic organics. Parker, L.V., et al., [1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., [1980, 69p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., [1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-21] MP 1085 Remote measurement of sea ice drift. Hibler, W.D., III, et al., [1975, p.31]. MP 1089 Landsat data analysis for New England reservoir management. Merry, C.J., et al., [1976, p.115-135] Mp 1089 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., [1979, 17 refs.] Mapping of the LANDSAT imagery of the Upper Sustina River. Gatto, L.W., et al., [1980, 41p.] CR 80-64 Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al., [1980, p.263-272) MP 1391	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Limnology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] Environmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., [1976, 53p.] Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., [1981, 8p.] SR 81-15 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., [1982, 106p.] SR 82-21 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., [1982, 184p.] SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., [1982, 597p.) SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., [1982, 1978, 116p.] Wastewater stabilization pond linings. Middlebrooks, E.J., et al., [1978, 116p.]
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Bsillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978. (1978, 2 vols.) MP 1145 Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) MP 1461 Land reckmastice Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., (1977, 116p.) SR 77-07 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) Land treatment: present status, future prospects. Pound, C.E., et al., (1978, 24p.) Experimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) SR 78-23 Nitrification inhibitor in land treatment of wastewater in cold regions. Elgawhary, S.M., et al., (1979, 25p.)	toxic organics. Parker, L.V., et al., t 1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718 MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p.) CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219; MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., t 1985, 60p.; LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211; Remote measurement of sea ice drift. Hibler, W.D., ill., et al., t 1975, p.541-554; Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., ill., et al., t 1976, p.115-135; MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p.; SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., t 1979, 17 reds.; SR 79-02 Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al., t 1980, p.263-272, MP 1391 Sea ice piling at Fairway Rock, Bering Strait, Alaska.	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., (1982, p.207-213, MP 1696 Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Limnology Arctic limnology: a review. Hobbie, J.E., (1973, p.127-168, MP 1607 Bavironmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., (1976, 53p.) SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., (1981, 9p.) Elimnology on the transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., (1982, 184p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 597p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 1979, 116p.) SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 1978, 116p.) SR 78-28 Wastewater stabilization pond linings. Middlebrooks, E.J., et al., (1978, 116p.) SR 78-28 Lipids Trends in carbohydrate and lipid levels in Arctic plants.
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., [1977, 61p.] SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., [1977, p.171-180] MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., [1977, p.489-510] MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, [1978, 2 vols.] MP 1145 Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., [1980, p.18-27] MP 1461 Land reclassation Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., [1977, 116p.] SR 77-07 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] MP 1268 Municipal sludge management: environmental factors. Reed, S.C., ed., [1977, Var. p.] Land treatment: present status, future prospects. Pound, C.E., et al., [1978, p.98-102] Five-year performance of CRREL land treatment test cells. Jenkins, T.F., et al., [1978, 24p.] SR 78-26 Experimental system for land renovation of effluent. Nylund, J.R., et al., [1978, 26p.] Nitrification inhibitor in land treatment of wastewater in cold	toxic organics. Parker, L.V., et al., [1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., [1980, 69p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., [1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-21] MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., [1975, p.31]. MP 1059 Landsat data addeformation from LANDSAT imagery. Hibler, W.D., III, et al., [1976, p.115-135] Landsat data analysis for New England reservoir management. Merry, C.J., et al., [1978, 61p.] SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., [1979, 17 refs.] Mapping of the LANDSAT imagery of the Upper Susitina River. Gatto, L.W., et al., [1980, 41p.] Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al., [1980, p.265-272, MP 1391 Sea ice piling at Fairway Rock, Bering Strait, Alaska. Kovacs, A., et al., [1981, p.985-1000) MP 1391	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., (1982, p.207-213, MP 1696 Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Liminology Arctic limnology: a review. Hobbie, J.E., (1973, p.127-168, MP 1007 Environmental analyses in the Kootenais River region, Montana. McKim, H.L., et al., (1976, 53p.) SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., (1981, 9p.) SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) SR 81-15 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., (1982, 184p.) SR 82-21 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 1979, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1979, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1979, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1979, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1979, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1979, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1978, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1978, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1978, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1978, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1978, 116p.) SR 82-23 Liminology of Cake Koocanusa, Montana. Storm, P.C., et al., (1982, 1982, 1982, 1982, 1982, 1982, 1982, 1982, 1982, 1982, 1982, 1982, 1982,
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978. (1978, 2 vols.) Land tee Planetary and extraplanetary event records in polar ice caps. Zelier, E.J., et al., (1980, p.18-27) MP 1461 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) MP 1406 Land treatment: present status, future prospects. Pound, C.E., et al., (1978, p.98-102) Reprimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) SR 78-26 Reperimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) SR 78-23 Nitrification inhibitor in land treatment of wastewater in cold regions. Elgawhary, S.M., et al., (1979, 25p.) SR 79-18 International and national developments in land treatment of wastewater. McKim, H.L., et al., (1979, 28p.)	toxic organics. Parker, L.V., et al., t 1984, 36p., CR 84-30 Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718, MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p., CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p., SR 85-03 LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211, MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., t 1975, p.541-554, p. 115-135, MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p., SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., t 1979, 17 rets., SR 79-02 Mapping of the LANDSAT imagery of the Upper Susitina River. Gatto, L.W., et al., t 1980, 41p., CR 80-64 Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al., t 1980, p.263-272, MP 1391 Sea ice piling at Fairway Rock, Bering Strait, Alaska. Kovaca, A., et al., t 1981, p.985-1000, MP 1391 Sea ice piling at Fairway Rock, Bering Strait, Alaska. McKim, H.L., et al., t 1984, 19p., SR 84-01	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., (1982, p.207-213, MP 1696 Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Liminology: a review. Hobbie, J.E., (1973, p.127-168, MP 1607 Bavironmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., (1981, 9p.) SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Mootana. Iskandar, I.K., et al., (1981, 9p.) SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) Limnology and primary productivity, Lake Koocanusa, Mootana. Woods, P.F., et al., (1982, 106p.) SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., (1982, 184p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 597p.) Limlogy of Lake Koocanusa, Montana. Storm, P.C., et al., (1972, 1979, 1979, 11p.) Wastewater stabilization pond linings. Middlebrooks, E.J., et al., (1978, 116p.) SR 78-22 Limlool Rand, J.H., (1980, 18p.) Phase 1: casing operation. Rand, J.H., (1980, 18p.) MP 1376 Ligids Trends in carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al., (1972, p.40-45) MP 1376 Liquid distribution and the dielectric constant of wet snow.
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., [1977, p.171-180] MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., [1977, p.489-510] Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, [1978, 2 vols.] Land ice Planetary and extraplanetary event records in polar ice capazeller, E.J., et al., [1980, p.18-27] Land reclamation Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., [1977, 116p.] RR 77-07 Land treatment of wastewater in subarctic Alasks. Sletten, R.S., et al., [1977, p.533-547] Municipal sludge management: environmental factors. Reed, S.C., ed., [1977, Var. p.] Land treatment: present status, future prospects. Pound, C.E., et al., [1978, p.98-102] MP 1406 Experimental system for land renovation of effluent. Nylund, J.R., et al., [1978, 24p.] SR 78-23 Nitrification inhibitor in land treatment of wastewater in cold regions. Elgawhary, S.M., et al., [1979, 25p.] International and national developments in land treatment of wastewater. McKim, H.L., et al., [1979, 28p.] MP 1420 Design of liquid-waste land application. Iskandar, J.K.,	toxic organics. Parker, L.V., et al., t 1984, 36p., CR 84-30 Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718, MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p., CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p., SR 85-03 LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211, MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., t 1975, p.541-554, p. 115-135, MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p., SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., t 1979, 17 rets., SR 79-02 Mapping of the LANDSAT imagery of the Upper Susitina River. Gatto, L.W., et al., t 1980, 41p., CR 80-64 Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al., t 1980, p.263-272, MP 1391 Sea ice piling at Fairway Rock, Bering Strait, Alaska. Kovaca, A., et al., t 1981, p.985-1000, MP 1391 Sea ice piling at Fairway Rock, Bering Strait, Alaska. McKim, H.L., et al., t 1984, 19p., SR 84-01	Polarization of skylight. Bohren, C., [1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., [1982, p.207-213] Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Limnology Arctic limnology: a review. Hobbie, J.E., [1973, p.127-168] Environmental analyses in the Kootenaia River region, Montana. McKim, H.L., et al., [1976, 53p.] SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., [1981, 9p.] Elimnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., [1982, 106p.] SR 81-18 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., [1982, 166p.] SR 82-21 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., [1982, 597p.] SR 82-21 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., et al., [1978, 116p.] SR 82-23 Limnology of Cake Koocanusa, Montana. Storm, P.C., et al., et al., [1978, 116p.] SR 78-28 1979 Greenland loe Sheet Program. Phase 1: casing operation. Rand, J.H., [1980, 18p.] Lipida Trends in carbohydrate and lipid levels in Arctic planta. McCown, B.H., et al., [1972, p.40-45] MP 1376 Liquid distribution and the dielectric constant of wet snow. Colbeck, S.C., [1980, p.21-39] Deforming finite elements with and without phase change.
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. MP 1478. [1978, 2 vols.] Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) MP 1461 Land reclamation Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., (1977, 116p.) SR 77-07 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Mp 1268 Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) MP 1406 Land treatment: present status, future prospects. Pound, C.E., et al., (1978, p.98-102) Esperimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) SR 78-26 Experimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) SR 78-23 Nitrification inhibitor in land treatment of wastewater in cold regions. Elgawhary, S.M., et al., (1979, 25p.) MP 1420 Design of liquid-waste land application. Iskandar, I.K., MP 1418	toxic organics. Parker, L.V., et al., t 1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p.) CR 80-14 Spatial analysis in recreation resource management. Edwardon, H.A., et al., t 1984, p.209-219; Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211; MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., t 1975, p.541-554; Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., t 1976, p.115-135; MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p.; SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., t 1979, 17 reta.; Mapping of the LANDSAT imagery of the Upper Susitina River. Gatto, L.W., et al., t 1980, p.263-272, Mp 1991 Sea ice piling at Fairway Rock, Bering Strait, Alaska. Kovaca, A., et al., t 1981, p.985-1000; MP 1460 Hydrologic modelling from Landsat land cover data. McKim, H.L., et al., t 1984, 19p.; SR 84-01 Lassers De-icing using lasers. Lane, J.W., et al., t 1976, 25p.; CR 76-10	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al, (1982, p.207-213) Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Liminology Arctic limnology: a review. Hobbie, J.E., (1973, p.127-168) Ravironmental analyses in the Kootenai River region, Montana. McKim, H.L., et al, (1981, 9p.) SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al, (1981, 9p.) SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K., et al, (1981, 8p.) Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.P., et al, (1982, 106p.) SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al, (1982, 184p.) SR 82-23 Limdss Wastewater stabilization pond linings. Middlebrooks, E.J., et al, (1978, 116p.) SR 78-28 Trends in carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al, (1972, p.40-45) Lipids Trends in carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al, (1972, p.40-45) Lipids solid interfaces Liquid distribution and the dielectric constant of wet snow. Colbeck, S.C., (1980, p.21-39) Deforming finite elements with and without phase change Lynch, L.R., et al, (1981, p.81-96) MP 1349
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978. (1978, 2 vols.) MP 1145 Land ice Planetary and extraplanetary event records in polar ice capazeller, E.J., et al., (1980, p.18-27) Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) Land treatment: present status, future prospects. Pound, C.E., et al., (1978, 24p.) Esperimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) Nitrification inhibitor in land treatment of wastewater in companies of wastewater in factors. Regions. Elgawhary, S.M., et al., (1979, 25p.) International and national developments in land treatment of wastewater. McKim, H.L., et al., (1979, 28p.) MP 1410 Design of liquid-waste land application. Iskandar, I.K., (1979, p.65-88) MP 1411 Land treatment systems and the environment. McKim, H.L., et al., (1979, p.201-225)	toxic organics. Parker, L.V., et al., t 1984, 36p., CR 84-30 Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718, MP 2111 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p., CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219, MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p., SR 85-03 LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211, MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., t 1975, p. 111, et al., t 1975, p. 541-554, Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., t 1976, p. 115-135, MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p., SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., t 1979, 17 refs., SR 79-02 Mapping of the LANDSAT imagery of the Upper Susitina River. Gatto, L.W., et al., t 1980, p.265-272, MP 1391 Sea ice plling at Fairway Rock, Bering Strait, Alaska. Kovacs, A., et al., t 1981, p.985-1000, MP 1391 Sea ice plling at Fairway Rock, Bering Strait, Alaska. Kovacs, A., et al., t 1981, p.985-1000, MP 1460 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., t 1984, 19p., SR 84-01 Lasers De-icing using lasers. Lane, I.W., et al., t 1976, 25p., CR 76-10 Dynamics of near-shore ice. Kovacs, A., et al., t 1977, p.151-163, MP 1073	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., (1982, p.207-213, MP 1696 Restoration of scidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Limnology: a review. Hobbie, J.E., (1973, p.127-168, MC 100, MC 10
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., [1977, 61p.] SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., [1977, p.171-180] MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., [1977, p.489-510] MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] Symposium on land treatment of wastewater, CRREL, Aug. 1978, [1978, 2 vols.] Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., [1980, p.18-27] Land reclamation Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., [1977, 116p.] SR 77-07 Land treatment of wastewater in subarctic Alasks. Sletten, R.S., et al., [1977, p.533-547] MP 1461 Land treatment: present status, future prospects. Reed, S.C., ed., [1977, Var. p.] MP 1417 Five-year performance of CRREL land treatment test cells. Jenkins, T.F., et al., [1978, 26p.] SR 78-26 Raperimental system for land renovation of effluent. Ny. lund, J.R., et al., [1978, 26p.] SR 78-26 Raperimental system for land treatment of wastewater in cold regions. Elgawhary, S.M., et al., [1979, 28p.] MP 1420 Design of liquid-waste land application. Iskandar, I.K., (1979, p.65-88), MP 1415 Land treatment systems and the environment. McKim, H.L., et al., [1979, p.201-225, MP 1415 Land treatment systems and the environment. McKim, H.L., et al., [1979, p.201-225, MP 1415 Land treatment systems and the environment. McKim, H.L., et al., [1979, p.201-225, MP 1415	toxic organics. Parker, L.V., et al., t 1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219; Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., t 1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211; MP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., t 1975, p.541-554; Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., t 1976, p.115-135; Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p.; SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., t 1979, 17 refs.; Mapping of the LANDSAT imagery of the Upper Susitina River. Gatto, L.W., et al., t 1980, p.263-272, Mapping of the LANDSAT imagery of the Upper Susitina River. Gatto, L.W., et al., t 1980, p.263-272, MP 1391 Sea ice piling at Pairway Rock, Bering Strait, Alaska. Kovaca, A., et al., t 1981, p.985-1000; MP 1460 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., t 1984, 19p.; SR 84-01 Lassers De-icing using lasers. Lane, J.W., et al., t 1976, 25p.; CR 76-10 Dynamics of near-shore ice. Kovaca, A., et al., t 1977, p.151-1631	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al, (1982, p.207-213) Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Liminology Arctic limnology: a review. Hobbie, J.E., (1973, p.127-168) Ravironmental analyses in the Kootenai River region, Montana. McKim, H.L., et al, (1981, 9p.) SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al, (1981, 9p.) SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K., et al, (1981, 8p.) Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.P., et al, (1982, 106p.) SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al, (1982, 184p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al, (1982, 597p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al, (1982, 1979 Greenland loe Sheet Program. Phase 1: casing operation. Rand, J.H., (1980, 18p.) SR 78-24 Lipids Trends in carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al, (1972, p.40-45) MP 1376 Liquid solid interfaces Liquid distribution and the dielectric constant of wet snow. Colbeck, S.C., (1980, p.21-39) Deforming finite elements with and without phase change Lynch, L.R., et al, (1913, p.81-96) Loads (forces) Porces on an ice boom in the Beauharnois Canal.
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, (1978, 2 vols.) Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) Land treatment: present status, future prospects. Pound, C.E., et al., (1978, 24p.) Experimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 24p.) SR 78-26 Raperimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) North of the company of the	toxic organics. Parker, L.V., et al., t 1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., t 1980, 69p.) CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219; MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Bailey, P.K., t 1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211; Nemote measurement of sea ice drift. Hibler, W.D., ill, et al., t 1975, p.541-534; Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., ill, et al., t 1976, p.115-135; MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p.; SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., t 1979, 17 reds.; SR 79-02 Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al., t 1980, 41p.; CR 80-04 Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al., t 1980, p.263-272; MP 1391 Sea ice piling at Fairway Rock, Bering Strait, Alaska. Kovaca, A., et al., t 1981, p.985-1000; MP 1460 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., t 1984, 19p.; SR 84-01 Lasers De-icing using lasers. Lane, I.W., et al., t 1976, 25p., CR 76-10 Dynamics of near-shore ice. Kovaca, A., et al., 1977, p.151-163; Latest best Deforming finite elements with and without phase change. Lynch, D.R., et al., 1981, p.81-96; MP 1493	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., (1982, p.207-213, MP 1696 Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Limnology Arctic limnology: a review. Hobbie, J.E., (1973, p.127-168, MP 1697 Bavironmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., (1976, 53p.) SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Islandar, I.K., et al., (1981, 9p.) Elimnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 81-18 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., (1982, 184p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 597p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 1978, 116p.) SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1978, 16p.) SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1979, 16p.) SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 597p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 597p.) SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1978, 16p.) SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1978, 16p.) SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1978, 16p.) SR 82-23 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1978, 1979, 1979) SR 83-24 Lipida Wastewater stabilization pond linings. Middlebrooks, E.J., et al., (1978, p.2) SR 83-24 Lipida Trends in carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al., (1972, p.40-45) MP 1376 Lipida carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al., (1979, p.40-45) MP 1349 Deforming finite elements with and without phase character. MP 1349 Lore on an ice boom in the
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, (1978, 2 vols.) MP 1145 Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) MP 1461 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Mp 1406 Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) Land treatment: present status, future prospects. Pound, C.E., et al., (1978, p.98-102) MP 1407 Experimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) Nitrification inhibitor in land treatment of wastewater in cold regions. Elgawhary, S.M., et al., (1979, 25p.) MP 1420 Design of liquid-waste land application. Iakandar, I.K., (1979, p.65-88) Land treatment systems and the environment. MP 1420 Design of liquid-waste land application. Iakandar, I.K., (1979, p.65-88) Land treatment systems and the environment. McKim, H.L., et al., (1979, p.201-225) MP 1441 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.) CR 77-24 Swp 76-26 Spr 76-26	toxic organics. Parker, L.V., et al., [1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., [1980, 69p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., [1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-211] Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-211] Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., [1976, p.115-135] MP 1849 Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., [1976, p.115-135] MP 1859 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., [1977, 17 cfb.] Mapping of the LANDSAT imagery of the Upper Sustina River. Gatto, L.W., et al., [1980, 41p.] Remote sensing of revegetation of burned tundra, Kokolik River, Gatto, L.W., et al., [1980, 41p.] Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al., [1980, p.263-272] MP 1391 Sea ice piling at Fairway Rock, Bering Strait, Alaska. Kovaca, A., et al., [1981, p.985-1000] MP 1460 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., [1984, 19p.] SR 84-01 Lasers De-icing using lasers. Lane, J.W., et al., [1976, 25p., CR 76-10 Dynamics of near-shore ice. Kovaca, A., et al., [1977, p.151-163] Latest beat	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., (1982, p.207-213) Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Liminology Arctic limnology: a review. Hobbie, J.E., (1973, p.127-168) Bavironmental analyses in the Kootenan River region, Montana. McKim, H.L., et al., (1976, 53p.) SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, i.K., et al., (1981, 9p.) Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., (1982, 184p.) SR 82-21 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 597p.) Liminology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 1979 Greenland loe Sheet Program. Phase 1: casing operation. Rand, J.H., (1980, 18p.) SR 78-24 Lipids Trends in carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al., (1972, p.40-45) Lipids solid interfaces Liquid distribution and the dielectric constant of wet snow. Colbeck, S.C., (1980, p.21-39) Lordon (forces) Forces on an ice boom in the Beauharnois Canal. Perham, R.R., et al., (1975, p.397-407) Log 1975, p.387-396, MP 858 Loc 1975, p.387-396, MP 256 Crop theory for a floating ice sheet. Nevel, D.E., (1976, 1976, 1975, p.387-396)
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, (1978, 2 voia.) MP 1145 Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) MP 1461 Land reckmastion Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., (1977, 116p.) SR 77-07 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) Land treatment: present status, future prospects. Pound, C.E., et al., (1978, 24p.) Experimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 24p.) SR 78-26 Raperimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) Nitrification inhibitor in land treatment of wastewater in cold regions. Elgawhary, S.M., et al., (1979, 25p.) SR 79-18 International and national developments in land treatment of wastewater. McKim, H.L., et al., (1979, 28p.) MP 1420 Design of liquid-waste land application. Iskandar, I.K., (1979, p.65-88) Land treatment systems and the environment. McKim, H.L., et al., (1979, p.201-225) MP 1417 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., (1980, p.452-460) MP 1418 Spray application of waste-water effluent in a cold climate.	toxic organics. Parker, L.V., et al., t 1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., t 1985, p.707-718 Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska Walker, D.A., et al., t 1980, 69p.) CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., t 1984, p.209-219; MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska Bailey, P.K., t 1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., t 1975, p.200-211; Nemote measurement of sea ice drift. Hibler, W.D., ill., et al., t 1975, p.541-534; Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., ill., et al., t 1976, p.115-135; MP 1059 Landsat data analysis for New England reservoir management. Merry, C.J., et al., t 1978, 61p.; SR 78-06 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., t 1979, 17 reds.; SR 79-02 Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al., t 1980, 41p.; CR 80-04 Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al., t 1980, p.263-272; MP 1391 Sea ice piling at Fairway Rock, Bering Strait, Alaska. Kovaca, A., et al., t 1981, p.985-1000; MP 1460 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., t 1984, 19p.; SR 84-01 Lasers De-icing using lasers. Lane, J.W., et al., t 1976, 25p., CR 76-10 Dynamics of near-shore ice. Kovaca, A., et al., 1977, p.151-163; Latest best Deforming finite elements with and without phase change. Lynch, D.R., et al., t 1981, p.81-96; MP 1493 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., (1982, 18p.) CR 82-12 Layers	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., (1982, p.207-213) Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Liminology: a review. Hobbie, J.E., (1973, p.127-168) Ravironmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., (1981, 9p.) SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., (1981, 9p.) Elimnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 81-18 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., (1982, 184p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 397p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 1989, 1989, 1979 Greenland Ice Sheet Program. Phase 1: casing operation. Rand, J.H., (1980, 18p.) Lipids Trends in carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al., (1982, 1995) Lipids solid interfaces Liquid distribution and the dielectric constant of wet snow. Colbeck, S.C., (1980, p.21-39) Lord, L.R., et al., (1981, p.81-96) Lords (forces) Forces on an ice boom in the Beauharnois Canal. Perham, MP 858 Ice forces on simulated structures. Zabilansky, L.J., et al., (1975, p.387-396) Crep theory for a floating ice sheet. Nevel, D.E., (1976, 98p.) Shallow snow performance of wheeled vehicles.
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., [1977, p.171-180] MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., [1977, p.489-510] MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., [1977, 34p.] CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, [1978, 2 vols.] MP 1461 Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., [1980, p.18-27] MP 1461 Land reclamation Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., [1977, 116p.] R.S., et al., [1977, p.533-547] Mnincipal sludge management: environmental factors. Reed, S.C., ed., [1977, Var. p.] Land treatment: present status, future prospects. Pound, C.E., et al., [1978, p.98-102] MP 1407 Experimental system for land renovation of effluent. Nylund, J.R., et al., [1978, 26p.] Nitrification inhibitor in land treatment of wastewater in cold regions. Elgawhary, S.M., et al., [1979, 25p.] SR 78-28 International and national developments in land treatment of wastewater. McKim, H.L., et al., [1979, p.201-225] RP 1420 Design of liquid-waste land application. Iskandar, I.K., [1979, p.55-85] Land treatment systems and the environment. McKim, H.L., et al., [1979, p.201-225] RP 1420 Design of liquid-waste land application. Iskandar, I.K., [1979, p.55-85] Land treatment systems and the environment. McKim, H.L., et al., [1979, p.201-225] RP 1420 Design of liquid-waste land application. Iskandar, I.K., [1979, p.55-85] Land treatment systems and the clean Water Act of 1977. Thomas, R.E., et al., [1980, p.452-460) MP 1418 Spray application of waste-water effluent in a cold climate Cassell, E.A., et al., [1980, p.650-626] MP 1403	toxic organics. Parker, L.V., et al., [1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., [1980, 65p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., [1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-211] Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-211] Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., [1976, p.115-135] MP 1849 Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., [1976, p.115-135] MP 1859 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., [1977, 17 cfb.] Mapping of the LANDSAT imagery of the Upper Sustina River. Gatto, L.W., et al., [1980, 41p.] Remote sensing of revegetation of burned tundra, Kokolik River, Gatto, L.W., et al., [1980, 41p.] Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al., [1980, p.263-272] Sea ice piling at Fairway Rock, Bering Strait, Alaska. Kovaca, A., et al., [1981, p.985-1000] MP 1460 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., [1984, 19p.] SR 84-01 Lasers De-icing using lasers. Lane, J.W., et al., [1976, 25p., CR 76-10 Dynamics of near-shore ice. Kovaca, A., et al., [1977, p.151-163] Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12	Polarization of skylight. Bohren, C., (1984, p.261-265) MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] CR 85-68 Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., (1982, p.207-213) Restoration of scidic dredge soils with sewage suldge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Liminology Arctic limnology: a review. Hobbie, J.E., (1973, p.127-168) Britonimental analyses in the Kootenais River region, Montana. McKim, H.L., et al., (1976, 53p.) R 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., (1981, 9p.) SR 81-15 Bottom heat transfer to water bodies in winter. O'Neill, K., et al., (1981, 8p.) SR 81-15 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 82-15 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., (1982, 184p.) SR 82-21 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 397p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 1979, 1979) R 82-25 Limings Wastewater stabilization pond linings. Middlebrooks, E.J., et al., (1978, 116p.) SR 78-22 1979 Greenland Ice Sheet Program. Phase 1: casing operation. Rand, J.H., (1980, 18p.) MP 1376 Liguid solid interfaces Liquid distribution and the dielectric constant of wet snow. Colbeck, S.C., (1980, p.21-39) MP 1349 Deforming finite elements with and without phase change. Lynch, L.R., et al., (1975, p.397-407) NP 185 Ice forces on simulated structures. Zabilansky, L.J., et al., (1975, p.387-396) Creep theory for a floating ice sheet. Nevel, D.E., (1976, 58p.) Shailow anow performance of wheeled vehicles. MP 1130
Symposium: geography of polar countries; selected papers and summaries. Brown, J., ed., (1977, 61p.) SR 77-06 Effects of wastewater on the growth and chemical composition of forages. Palazzo, A.J., (1977, p.171-180) MP 975 Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., (1977, p.489-510) MP 976 Land treatment of wastewater at Manteca, Calif., and Quincy, Washington. Iskandar, I.K., et al., (1977, 34p.) CR 77-24 Symposium on land treatment of wastewater, CRREL, Aug. 1978, (1978, 2 voia.) MP 1145 Land ice Planetary and extraplanetary event records in polar ice caps. Zeller, E.J., et al., (1980, p.18-27) MP 1461 Land reckmastion Bibliography of soil conservation activities in USSR permafrost areas. Andrews, M., (1977, 116p.) SR 77-07 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., (1977, p.533-547) Municipal sludge management: environmental factors. Reed, S.C., ed., (1977, Var. p.) Land treatment: present status, future prospects. Pound, C.E., et al., (1978, 24p.) Experimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 24p.) SR 78-26 Raperimental system for land renovation of effluent. Nylund, J.R., et al., (1978, 26p.) Nitrification inhibitor in land treatment of wastewater in cold regions. Elgawhary, S.M., et al., (1979, 25p.) SR 79-18 International and national developments in land treatment of wastewater. McKim, H.L., et al., (1979, 28p.) MP 1420 Design of liquid-waste land application. Iskandar, I.K., (1979, p.65-88) Land treatment systems and the environment. McKim, H.L., et al., (1979, p.201-225) MP 1417 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., (1980, p.452-460) MP 1418 Spray application of waste-water effluent in a cold climate.	toxic organics. Parker, L.V., et al., [1984, 36p.] Toxic organics removal kinetica in overland flow land treatment. Jenkins, T.F., et al., [1985, p.707-718] Landforms Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., [1980, 65p.] CR 80-14 Spatial analysis in recreation resource management. Edwardo, H.A., et al., [1984, p.209-219] MP 2084 Periglacial landforms and processes, Kenai Mts., Alaska. Balley, P.K., [1985, 60p.] LANDSAT Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-211] Near real time hydrologic data acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-211] Near real time hydrologic facts acquisition utilizing the LANDSAT system. McKim, H.L., et al., [1975, p.200-211] NP 1055 Remote measurement of sea ice drift. Hibler, W.D., III, et al., [1976, p.115-135] MP 1849 Sea ice drift and deformation from LANDSAT imagery. Hibler, W.D., III, et al., [1976, p.115-135] MP 1059 Landsat data collection platform, south central Alaska. Haugen, R.K., et al., [1976, p.115-135] Mapping of the LANDSAT imagery of the Upper Sueita Marping of the LANDSAT imagery of the Upper Sueita River. Gatto, L.W., et al., [1980, 41p.] CR 30-04 Remote sensing of revegetation of burned tundra, Kokolik River, Alaska. Hall, D.K., et al., [1980, p.263-272, MP 1391] Sea ice piling at Fairway Rock, Bering Strait, Alaska. Kovaca, A., et al., [1981, p.985-1000) MP 1460 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., [1984, 19p.] SR 84-01 Lasers De-icing using lasers. Lane, J.W., et al., [1976, 25p.] CR 76-10 Dynamics of near-shore ice. Kovaca, A., et al., [1977, p.151-163] Latest beet Deforming finite elements with and without phase change. Lynch, D.R., et al., [1981, p.81-96] MP 1493 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., [1982, 18p.] Enclosing fine-grained soils in plastic moisture barriers.	Polarization of skylight. Bohren, C., (1984, p.261-265, MP 1794 Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] Liming Wastewater treatment in Alaska. Schneiter, R.W., et al., (1982, p.207-213) Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28 Liminology: a review. Hobbie, J.E., (1973, p.127-168) Ravironmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., (1981, 9p.) SR 76-13 Phosphorus chemistry of sediments of Lake Koocanusa, Montana. Iskandar, I.K., et al., (1981, 9p.) Elimnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 81-18 Limnology of Lake Koocanusa, MT, the 1967-1972 study. Bonde, T.J.H., et al., (1982, 184p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 397p.) Limnology of Lake Koocanusa, Montana. Storm, P.C., et al., (1982, 1989, 1989, 1979 Greenland Ice Sheet Program. Phase 1: casing operation. Rand, J.H., (1980, 18p.) Lipids Trends in carbohydrate and lipid levels in Arctic plants. McCown, B.H., et al., (1982, 1995) Lipids solid interfaces Liquid distribution and the dielectric constant of wet snow. Colbeck, S.C., (1980, p.21-39) Lord, L.R., et al., (1981, p.81-96) Lords (forces) Forces on an ice boom in the Beauharnois Canal. Perham, MP 858 Ice forces on simulated structures. Zabilansky, L.J., et al., (1975, p.387-396) Crep theory for a floating ice sheet. Nevel, D.E., (1976, 98p.) Shallow snow performance of wheeled vehicles.

Loads (forces) (cont.)	Survey of ice problem areas in navigable waterways. Zufelt, J., et al, [1985, 32p.] SR 25-02	Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] CR 80-04
Concentrated loads on a floating ice sheet. Nevel, D.E., (1977, p.237-245) MP 1062	Local	Characteristics of permafrost beneath the Besufort Sea. Seli-
Intermittent ice forces acting on inclined wedges. Tryde, P.,	Effects of salt on unfrozen water content in silt, Lanzhou,	mann, P.V., et al, [1981, p.125-157] MP 1428
(1977, 26p.) CR 77-26	China. Tice, A.R., et al, [1984, 18p.] CR 84-16	Environmental mapping of the Arctic National Wildlife Ref-
Viscoelasticity of floating ice plates subjected to a circular load. Takagi, S., [1978, 32p.] CR 78-05	Logistics Towing icebergs. Lonsdale, H.K., et al, [1974, p.2]	uge, Alaska. Walker, D.A., et al, [1982, 59p. + 2 maps] CR 82-37
Load tests on membrane-enveloped road sections. Smith,	MP 1020	Maps
N., et al, [1978, 16p.] CR 78-12	Operational report: 1976 USACRREL-USGS subsea perma-	Plant recovery from Arctic oil spills. Walker, D.A., et al.
Ice cover forces on structures. Kerr, A.D., [1978, p.123-134] MCP 879	frost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, 20p.; SR 76-12	[1978, p.242-259] MP 1184 Geobotanical atlas of the Prudhoe Bay region, Aleska.
Horizontal forces exerted by floating ice on structures. Kerr,	Logisms	Walker, D.A., et al, [1980, 69p.] Cal 80-14
A.D., [1978, 9p.] CR 78-15	Debris of the Chena River. McFadden, T., et al. 1976,	Marine biology
Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al, 1979, 32p., SR 79-69	14p. ₁ CR 76-26 Long rungs forecasting	Chosnofiagellata from the Weddell Sea, summer 1977. Buck, K.R., [1980, 26p.] CR 88-16
Safe ice loads computed with a pocket calculator. Nevel,	Study of climatic elements occurring concurrently. Bilello,	Chosnoflagellates from the Weddell Sea. Buck, K.R.,
D.B., (1979, p.205-223) MP 1249	M.A., [1976, p.23-30] MP 1613	[1981, p.47-54] MP 1453
Analysis of plastic shock waves in snow. Brown, R.L., (1979, 14p.) CR 79-29	Low temperature research	Physical mechanism for establishing algal populations in frazil ice. Garrison, D.L., et al, 1983, p.363-365 ₁
Power requirements and methods for long distance large ice-	Proceedings of the Second International Symposium on Cold Regions Engineering. Burdick, J., ed, 1977, 597p.;	MP 1717
berg towing. Mellor, M., [1980, p.23]-240, MP 1275	MP 952	Sea ice microbial communities in Antarctica. Garrison,
Pressure waves in snow. Brown, R.L., [1980, p.99-107]	Optical engineering for cold environments. Aitken, G.W., ed, [1983, 225p.] MP 1646	D.L., et al, [1986, p.243-250] MP 2026 Marine geology
MP 1306	Low temperature tests	Coastal marine geology of the Beaufort, Chukchi and Bering
Extending the useful life of DYE-2 to 1986. Tobiasson, W., et al, [1980, 37p.] SR 80-13	Load tests on membrane-enveloped road sections. Smith,	Seas. Gatto, L.W., [1980, 357p.] SR 80-85
Working group on ice forces on structures. Carstens, T., ed,	N., et al, [1978, 16p.] CR 78-12	Distribution and features of bottom sediments in Alaskan
[1980, 146p.] SR 80-26	Water vapor adsorption by sodium montmorillonite at -5C. Anderson, D.M., et al, (1978, p.638-644) MP 981	cosstal waters. Sellmann, P.V., [1980, 50p.] SR 80-15
Bending and buckling of a wedge on an elastic foundation. Nevel, D.E., 1980, p.278-288, MP 1363	Waterproofing strain gages for low ambient temperatures.	Marine meteorology
Nevel, D.E., 1980, p.278-288 ₁ MP 1363 Some promising trends in ice mechanics. Assur, A., 1980,	Garfield, D.E., et al, [1978, 20p.] SR 78-15	Using a MicroCORA sounding system in the southern ocean. Andeas, E.L., et al, [1982, 17p.] CR 82-28
p.1-15 ₁ MP 1300	Thermal and load-associated distress in pavements. Johnson, T.C., et al, 1978, p.403-437, MP 1269	Andeas, E.L., et al, [1982, 17p.] CR 82-28 US/USSR Weddell Polynys expedition, Upper air data, 1981.
Mechanics of cutting and boring in permafrost. Mellor, M.,	Resilient response of two frozen and thawed soils. Chamber-	Andreas, E.L., [1983, 288p.] SR 83-13
[1980, 82p.] CR 88-21 Investigation of the snow adjacent to Dye-2, Greenland.	lain, B.J., et al, [1979, p.257-271] MP 1176	Simple boom for use in measuring meteorological data from a ship. Andreas, B.L., et al, [1984, p.227-237]
Ueda, H.T., et al, [1981, 23p.] SR 81-03	Grouting silt and sand at low temperatures—a laboratory investigation. Johnson, R., [1979, 33p.] CR 79-05	a snip. Andreas, B.L., et al, [1984, p.227-237] MP 1752
Vehicle tests and performance in snow. Berger, R.H., et al.	Heat and mass transfer from freely falling drops at low tem-	Marine transportation
[1981, p.51-67] MP 1477 Macroscopic view of snow deformation under a vehicle.	peratures. Zarling, J.P., [1980, 14p.] CR 80-18	Biffects of ice on coal movement via the inland waterways.
Richmond, P.W., et al, [1981, 20p.] SR 81-17	Field cooling rates of asphalt concrete overlays at low temper- atures. Eaton, R.A., et al, [1980, 11p.] CR 80-30	Lunardini, V.J., et al, [1981, 72p.] SR \$1-13 Minrs (planet)
Pavement deflection after freezing and thawing. Chamber-	Macquaria Island	Mars soil-water analyzer: instrument description and status.
isin, E.J., [1981, 10p.] CR 81-15 Acoustic emission and deformation of ice plates. Xiroucha-	Soil properties of the International Tundra Biome sites.	Anderson, D.M., et al, [1977, p.149-158] MP 912
kis, P.C., et al, [1982, p.129-139] MIP 1589	Brown, J., et al, [1974, p.27-48] MP 1943	UV radiational effects on: Martian regolith water. Nadesu, P.H., (1977, 89p.) MP 1072
Force distribution in a fragmented ice cover. Daly, S.F., et	Tundra and analogous soils. Everett, K.R., et al. [1981, p.139-179] MP 1405	Water vapor adsorption by sodium montmorillonite at -5C.
al, [1982, p.374-387] MP 1531 Piling in frozen ground. Crory, F.B., [1982, p.112-124]	Magnetic measurement	Anderson, D.M., et al, [1978, p.638-644] MP 981
MP 1722	Bedrock geology survey in northern Maine. Sellmann, P.V.,	Viking GCMS analysis of water in the Martian regolith.
Determining the characteristic length of model ice sheets.	et al, [1976, 19p.] CR 76-37 Magnetic properties	Anderson, D.M., et al, [1978, p.55-61] MP 1195 Proceedings of the second planetary water and polar pro-
Sodhi, D.S., et al, [1982, p.99-104] MP 1570 CRRBL instrumented vehicle: hardware and software.	Detection of Arctic water supplies with geophysical tech-	cesses colloquium, 1978. [1978, 209p.] MP 1193
Blaisdell, G.L., (1983, 75p.) SR 83-03	niques. Arcone, S.A., et al, [1979, 30p.] CR 79-15	Analysis of water in the Martian regolith. Anderson, D.M.,
Stress/strain/time relations for ice under uniaxial compres-	Magnetic surveys	et ål, [1979, p.33-38] MP 1409 Mass balance
sion. Mellor, M., et al, [1983, p.207-230] MP 1587 Frozen soil characteristics that affect land mine functioning.	Measurements of ground resistivity. Arcone, S.A., [1982, p.92-110] MP 1513	Mass-balance aspects of Weddell Sea pack-ice. Ackley, S.F.,
Richmond, P.W., [1983, 18p.] SR 83-05	Comparative field testing of buried utility locators. Bigl,	(1979, p.391-405) MP 1286
Effect of loading on the unfrozen water content of allt. Oli-	S.R., et al, [1984, 25p.] MIP 1977	Mass balance of a portion of the Ross Ice Sheif. Jezek, K.C., et al, [1984, p.381-384] MP 1919
phant, J.L., et al, [1983, 17p.] SR 83-18 Stress measurements in ice. Cox, G.F.N., et al, [1983,	Maintenance Approach roads, Greenland 1955 program. [1959, 100p.]	Mass transfer
31p.; CR 83-23	MP 1522	Mass transfer along ice surfaces. Tobin, T.M., et al. 1977,
Effect of stress application rate on the creep behavior of poly-	Haines-Fairbanks pipeline: design, construction and opera- tion. Garfield, D.E., et al, [1977, 20p.] SR 77-84	p.34-37 ₁ MP 1091 Heat and mass transfer from freely falling drops at low tem-
crystalline ice. Cole, D.M., [1983, p.454-459] MP 1671	tion. Garfield, D.E., et al, [1977, 20p.] SR 77-84 Maintaining buildings in the Arctic. Tobiasson, W., et al,	peratures. Zarling, J.P., [1980, 14p.] CR 80-18
Experimental determination of buckling loads of cracked ice	[1977, p.244-251] MP 1506	Estimation of heat and mass fluxes over Arctic leads. An-
aheets. Sodhi, D.S., et al, [1984, p.183-186] MP 1687	Excevation of frozen materials. Moore, H.B., et al., [1980,	dreas, E.L., [1980, p.2057-2063] MP 1410 Heat transfer in cold climates. Lunardini, V.J., [1981,
Force distribution in a fragmented ice cover. Stewart, D.M.,	p.323-345 ₁ MP 1360 Construction engineering community: materials and diagnos-	731p. ₃ MP 1435
et al, [1984, 16p.] CR 84-07	tics. [1986, 54p.] SR 86-01	One-dimensional transport from a highly concentrated, trans-
Static determination of Young's modulus in sea ice. Richter- Menge, J.A., 1984, p.283-286; MP 1789	Manuels	fer type source. O'Neill, K., [1982, p.27-36] MP 1489
Mechanics of ice cover breakthrough. Kerr, A.D., 1984.	Cold climate utilities delivery design manual. Smith, D.W., et al, [1979, c300 leaves] MP 1373	On the temperature distribution in an air-ventilated anow lay-
p.245-262 ₁ NCP 1997	Guidebook to permafrost and its features, northern Alaska.	er. Yen, YC., [1982, 10p.] CR 82-65
Creep of a strip footing on ice-rich permafrost. Sayles, F.H., [1985, p.29-51] MP 1731	Brown, J., ed, [1983, 230p.] MP 1640 User's guide for the BIBSORT program for the IBM-PC per-	Calculation of advective mass transport in heterogeneous media. Daly, C.J., [1983, p.73-89] MP 1697
Simple design procedure for heat transmission system piping.	User's guide for the BIBSORT program for the IBM-PC per- sonal computer. Kyriakakis, T., et al, [1985, 61p.] SE 85-04	Aerosol growth in a cold environment. Yen, YC., [1984,
Phetteplace, G.E., [1985, p.1748-1752] MP 1942		21p. ₁ CR 84-06
Brittleness of reinforced concrete structures under arctic conditions. Kivekis, L., et al, [1985, 28 + 14p.]	Remarkant and recentation many from PRTS improve.	Status of numerical models for heat and mass transfer in frost- susceptible soils. Berg, R.L., [1984, p.67-71]
MP 1969	Permafrost and vegetation maps from BRTS imagery. Anderson, D.M., et al, [1973, 75p.] MP 1063	MP 1851
Experience with a biaxial ice stress sensor. Cox, G.F.N., 1985, p.252-258; MP 1937	ERTS mapping of Arctic and subarctic environments. And-	Thomas anittance of disthance was materials. Nowie
[1985, p.252-258] MP 1937 Confined compressive strength of multi-year pressure ridge	erson, D.M., et al, [1974, 128p.] MP 1047 Land use/vegetation mapping in reservoir management.	Thermal emittance of diathermanous materials. Munis, R.H., et al, [1984, p.209-220] MP 1863
sea ice samples. Cox, G.F.N., et al, [1986, p.365-373]	Cooper, S., et al. [1974, 30p.] MP 1939	Emittance and interpretation of thermal images. Munis,
Locks (weterways)	Regionalized feasibility study of cold weather earthwork.	R.H., et al, [1985, p.72-78] MP 1962 Mathematical models
Laboratory experiments on lock wall deicing using pneumatic	Roberts, W.S., 1976, 190p.; SR 76-02 Skylab imagery: Application to reservoir management in New	Prediction and validation of temperature in tundra soils.
devices. Itagaki, K., et al, [1977, p.53-68] MIP 974	England. McKim, H.L., et al, [1976, 51p.]	Brown, J., et al, [1971, p.193-197] MIP 907
Lock wall deicing. Hanamoto, B., [1977, p.7-14] MP 972	SR 76-07	Heat and moisture flow in freezing and thawing soils—a field study. Berg, R.L., [1975, p.148-160] MP 1612
	Ecology on the Yukon-Prudhoe haul road. Brown, J., ed, [1978, 131p.] MP 1115	Thermoinsulating media within embankments on perennially
Lock wall deicing studies. Hanamoto, B., ed, [1977, 68p.] SR 77-23	Water resources by satellite. McKim, H.L., [1978, p.164-	frozen soil. Berg, R.L., (1976, 161p.) SR 76-03
Lock wall deicing with high velocity water jet at Soo Locks, Mi. Calkins, D.J., et al, [1977, p.23-35] MP 973	169 ₁ MP 1090	Creep theory for a floating ice abeet. Nevel, D.B., 1976,
Effects of ice on coal movement via the inland waterways.	Geoscological mapping scheme for Alaskan coastal tundra. Everett, K.R., et al. (1978, p.359-365) MP 1998	98p.) SR 76-04 Galerkin finite element analog of frost heave. Guymon,
Lunardini, V.J., et al, [1981, 72p.] SR 81-13	Estuarine processes and intertidal habitats in Grave Harbor.	G.L., et al, (1976, p.111-113) MP 898
los control at navigation locks. Hanamoto, B., 1981,		
	Washington: a demonstration of remote sensing techniques.	Excavating rock, ice, and frozen ground by electromagnetic
p.1088-1095; MP 1448 Application of a block copolymer solution to ice-prone struc-	Washington: a demonstration of remote sensing techniques. Gatto, L.W., [1978, 79p.] CR 78-18	radiation. Hockstra, P., [1976, 17p.] CR 76-36
Application of a block copolymer solution to ice-prone struc- tures. Hanamoto, B., (1983, p.155-158) MP 1636	Washington: a demonstration of remote sensing techniques. Gatto, L.W., [1978, 79p.] Electrical ground impedance. Arcone, S.A., et al., [1978, 92p.] MP 1221	radiation. Hoekstra, P., [1976, 17p.] CR 76-36 Mathematical model to predict frost heave. Berg, R.L., et al., [1977, p.92-109] MP 1131
Application of a block copolymer solution to ice-prone struc-	Washington: a demonstration of remote sensing techniques. Gatto, L.W., [1978, 79p.] Electrical ground impedance. Arcone, S.A., et al. [1978,	radiation. Hoekstra, P., [1976, 17p.] CR 76-36 Mathematical model to predict frost heave. Berg, R.L., et al,

Viscous wind-driven circulation of Arctic sea ice. Hibler, W.D., III, et al, (1977, p.95-133) MP 983	Using electronic measurement equipment in winter. Atkins, R.T., [1981, 7p.] TD \$1-61	Metal mow triction loe characteristics in Whitefish Bay and St. Marys River i
Finite element formulation of a sea ice drift model. Sodhi, D.S., et al, [1977, p.67-76] MP 1165	CRREL frost heave test, USA. Chamberlain, B.J., et al. [1981, p.55-62] MP 1499	winter. Vance, G.P., [1980, 27p.] SR 88-3
Pinite element model of transient heat conduction. Guy-	Airborne-Snow Concentration Measuring Equipment. La-	Metals Atmospheric trace metals and sulfate in the Greenland Io
mon, G.L., et al, [1977, 167p.] SR 77-38 Roof loads resulting from rain on snow. Colbeck, S.C.,	combe, J., [1982, p.17-46] MP 1981 Technique for measuring the mass concentration of falling	Sheet. Herron, M.M., et al, [1977, p.915-920] MP 94
[1977, p.482-490] MP 982 Model simulation of near shore ice drift, deformation and	snow. Lacombe, J., (1983, p.17-28) MP 1647 Progress in methods of measuring the free water content of	Blank corrections for ultratrace atomic absorption analysis Cragin, J.H., et al, [1979, 5p.] CR 79-6
thickness. Hibler, W.D., III, [1978, p.33-44]	snow. Fisk, D.J., [1983, p.48-51] MP 1649 Boom for shipboard deployment of meteorological instru-	Techniques for measuring Hg in soils and sediments. Cragin J.H., et al, [1985, 16p.] SR 85-1
Simulation of the movement of conservative chemicals in soil	ments. Andreas, E.L., et al, [1983, 14p.] SR 83-28	Metamorphism (snow)
solution. Nakano, Y., et al. (1978, p.371-380) MP 1156	Surface roughness of Ross Sea pack ice. Govoni, J.W., et al, [1983, p.123-124] MIP 1764	Thermodynamics of snow metamorphism due to variations i curvature. Colbeck, S.C., [1980, p.291-301]
Symposium on land treatment of wastewater, CRREL, Aug. 1978. [1978, 2 vols.] MP 1145	Evaluation of a biaxial ice stress sensor. Cox, G.F.N., [1984, p.349-361] MP 1836	MP 136 Overview of seasonal snow metamorphism. Colbeck, S.C.
Nitrogen behavior in land treatment of wastewater: a simpli- fied model. Selim, H.M., et al, [1978, p.171-179]	Simple boom for use in measuring meteorological data from a ship. Andreas, E.L., et al, [1984, p.227-237]	[1982, p.45-61] MP 156 Workshop on the Properties of Snow, 1981. Brown, R.L., et
MP 1149 NO3-N in percolate water in land treatment. lakandar, l.K.,	MP 1752	[1982, 135p.] SR 82-1
et al, [1978, p.163-169] MP 1148	In-ice calibration tests for an elongated, uniaxial brass ice stress sensor. Johnson, J.B., [1985, p.244-249] MP 1859	[1983, p.5475-5482] MP 160
Numerical simulation of atmospheric ice accretion. Ackley, S.F., et al, [1979, p.44-52] MP 1235	Vertically stable benchmarks: a synthesis of existing informa-	Comments on the metamorphism of snow. Colbeck, S.C [1983, p.149-151] MP 165
Effect of the oceanic boundary layer on the mean drift of pack ios: application of a simple model. McPhee, M.G., (1979,	tion. Gatto, L.W., [1985, p.179-188] MP 2069 Mechanical properties	Comments on "Theory of metamorphism of dry snow" b S.C. Colbeck. Sommerfeld, R.A., (1984, p.4963-4965)
p.388-400; MP 1198 Dynamic thermodynamic sea ice model. Hibler, W.D., III,	Resurvey of the "Byrd" Station, Antarctica, drill hole. Gar- field, D.B., et al, [1976, p.29-34] MP 846	MP 180 New classification system for the seasonal anow cover. Col
[1979, p.815-846] MP 1247 Mathematical model to correlate frost heave of pavements.	Kinematics of axial rotation machines. Mellor, M., [1976,	beck, S.C., [1984, p.179-181] MP 192 Meteorological data
Berg, R.L., et al, [1980, 49p.] CR 80-10	45p. ₁ CR 76-16 Movement study of the trans-Alaska pipeline at selected sites.	Automatic data collection equipment for occanographic ap
Numerical modeling of sea ice in the seasonal sea ice zone. Hibler, W.D., III, [1980, p.299-356] MP 1296	Ueda, H.T., et al, [1981, 32p.] CR 81-04 Machanical tests	plication. Dean, A.M., Jr., (1978, p.1111-1121) MIP 182
Shore ice pile-up and ride-up: field observations, models, theoretical analyses. Kovacs, A., et al, (1980, p.209-	Report of the ITTC panel on testing in ice, 1978. Franken- stein, G.E., et al, [1978, p.157-179] MP 1140	Midwinter temperature regime and snow occurrence in Germany. Bilello, M.A., et al. (1978, 56p.) CR 78-2
298 ₁ MP 1295 Continuum sea ice model for a global climate model. Ling.	Mechanical properties of multi-year pressure ridge samples.	Land treatment climatic survey at CRREL. Bilello, M.A., e al, [1978, 37p.] SR 78-2
C.H., et al, (1980, p.187-196) MP 1622 Nonsteady ice drift in the Strait of Belle Iale. Sodhi, D.S.,	Richter-Menge, J.A., [1985, p.244-251] MP 1936 Meetings	Soil characteristics and climatology during westewater ar
et al, [1980, p.177-186] MP 1364	Workshop on permafrost-related research and TAPS. (1975, 37p.) MP 1122	plication at CRREL. Iskandar, I.K., et al, [1979, 82p.] SR 79-2
Linearized Boussinesq groundwater flow equation. Daly, C.J., et al, [1981, p.875-884] MP 1470	Third International Symposium on Ice Problems, 1975. Frankenstein, G.E., ed, [1975, 627p.] MIP \$45	Prototype wastewater land treatment system. Jenkins, T.F et al, [1979, 91p.] SR 79-3
Frost heave model. Hromadka, T.V., II, et al, [1982, p.1-10] MP 1567	Symposium: geography of polar countries; selected papers	Forecasting ice formation and breakup on Lake Champleir Bates, R.B., et al. (1979, 21p.) CR 79-2
Field tests of a frost-heave model. Guymon, G.L., et al, [1983, p.409-414] MP 1637	and summaries. Brown, J., ed, [1977, 61p.] SR 77-06	Winter thermal structure, ice conditions and climate of Lak
Equations for determining gas and brine volumes in sea ice.	Proceedings of the Second International Symposium on Cold Regions Engineering. Burdick, J., ed., [1977, 597p.]	Winter surveys of the upper Susitna River, Alaska. Bilelle
Cox, G.F.N., et al, [1983, p.306-316] MP 2055 Incressed heat flow due to snow compaction: the simplistic	NP 952 Symposium on land treatment of wastewater, CRREL, Aug.	M.A., [1980, 30p.] SR 80-1 Ice jams and meteorological data for three winters, Ottauque
approach. Colbeck, S.C., [1983, p.227-229] MP 1693	1978. [1978, 2 vols.] MIP 1145	chee River, Vt. Bates, R.E., et al, (1981, 27p.)
Numerical simulation of sea ice induced gouges on the shelves of the polar oceans. Weeks, W.F., et al, [1985, p.259-	Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.B., et al, [1978, p.157-179] MP 1140	Point Barrow, Alaska, USA. Brown, J., [1981, p.775-776] MP 143
265 ₁ MP 1938 Measurement	Workshop on Ecological Effects of Hydrocarbon Spills in Alaska. Atlas, R.M., et al, [1978, p.155-157]	Synoptic meteorology during the SNOW-ONE field experi
Measuring unmetered steam use with a condensate pump	MP 1183 Proceedings of the second planetary water and polar pro-	ment. Bilello, M.A., [1981, 55p.] SR 81-2 SNOW-ONE-A; Data report. Aitken, G.W., ed, [1982,
cycle counter. Johnson, P.R., [1977, p.434-442] MIP 957	cesses colloquium, 1978. [1978, 209p.] MP 1193 Modeling snow cover runoff meeting, Sep. 1978. Colbeck,	641p. ₁ SR 82-0 Meteorology. Bates, R.E., (1982, p.43-180) MP 156
Physical measurement of ice jams 1976-77 field season. Wuebben, J.L., et al, [1978, 19p.] SR 78-03	S.C., ed, [1979, 432p.] SR 79-36 International Workshop on the Seasonal Sea Ice Zone, Mon-	Surface meteorology US/USSR Weddell Polynya Expedition 1981. Andreas, B.L., et al. (1983, 32p.) SR 83-1
Physical measurements of river ice jams. Calkins, D.J., [1978, p.693-695] MP 1159	terey, California, Feb. 26-Mar.1, 1979. Andersen, B.G.,	Site-specific and synoptic meteorology. Bates, R.E., 1983, p.13-80, MP 184
Measuring instruments Instrument for determining snow properties related to traffi-	ed, [1980, 357p.] MIP 1292 Problems of the seasonal sea ice zone. Weeks, W.F., [1980,	Climate at CRREL, Hanover, New Hampshire. Bates, R.E.
cability. Parrott, W.H., et al. [1972, p.193-204]	p.1-35 ₁ MP 1293 Workshop on Environmental Protection of Permafrost Ter-	[1984, 78p.] SR 84-2 Prozen precipitation and weather, Munchen/Riem, Wes
Case for comparison and standardization of carbon dioxide	rain. Brown, J., et al, [1980, p.30-36] MP 1314 U.SSoviet seminar on building under cold climates and on	Germany. Bilello, M.A., (1984, 47p.) SR 84-3 Overview of meteorological and snow cover characterizatio
reference gases. Kelley, J.J., et al, [1973, p.163-181] MP 964	permafrost. [1980, 365pr] SR 88-40	at SNOW-TWO. Bates, R.E., et al, [1984, p.171-191] MP 186
Remote sensing program required for the AIDJEX model. Weeks, W.F., et al, (1974, p.22-44) MP 1040	Melting Roof response to icing conditions. Lane, J.W., et al., 1979,	Comparison of winter climatic data for three New Hampshir sites. Govoni, J.W., et al, [1986, 78p.] SR 86-0
Heat and moisture flow in freezing and thawing soils—a field study. Berg, R.L., [1975, p.148-160] MP 1612	40p. ₁ CR 79-17 Melting points	Meteorological factors
Near real time hydrologic data acquisition utilizing the	Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance. Tice, A.R., et al, [1980,	Report on ice fall from clear sky in Georgia October 26, 1959 Harrison, L.P., et al, [1960, 31p. plus photographs]
LANDSAT system. McKim, H.L., et al, [1975, p.200- 211] MP 1035	p.400-412 ₁ MP 1412 Temperature and interface morphology in a melting ice-water	MP 101 Seasonal regime and hydrological significance of stream is
On the use of tensiometers in snow hydrology. Colbeck, S.C., [1976, p.135-140] Colbeck, MP 843	system. Yen, YC., (1984, p.305-325) MP 1727	ings in central Alaska. Kane, D.L., et al, [1973, p.528- 540] MP 102
Winter thermal structure and ice conditions on Lake Cham- plain, Vermont. Bates, R.E., [1976, 22p.] CR 76-13	Maltwater Snow accumulation for arctic freshwater supplies. Slaughter,	Mesoscale measurement of snow-cover properties. Bilelk M.A., et al, (1973, p.624-643) MP 102
Remote-reading tensiometer for use in subfreezing tempera- tures. McKim, H.L., et al, [1976, p.31-45] MP 897	C.W., et al, [1975, p.218-224] MP 860 Short-term forecasting of water run-off from anow and ice.	Decay patterns of land-fast see ice in Canada and Alaski
Mars soil-water analyzer: instrument description and status.	Colbeck, S.C., [1977, p.571-588] MIP 1967	Bilello, M.A., [1977, p.1-10] MP 116 Computer modeling of stmospheric ice secretion. Ackley
Anderson, D.M., et al. (1977, p.149-158) MP 912 See ice thickness profiling and under-ice oil entrapment.	Sintering and compaction of snow containing liquid water. Colbeck, S.C., et al, [1979, p.13-32] MP 1190	S.F., et al, [1979, 36p.] CR 79-6 Ablation seasons of arctic and antarctic sea ice. Andrea
Kovacs, A., (1977, p.547-550) MP 940	Water flow through heterogeneous snow. Colbeck, S.C., [1979, p.37-45] MP 1219	B.L., et al, [1982, p.440-447] MP 151 loe jams and flooding on Ottauquechee River, VT. Bates, R
Byaluation of electrical equipment for measuring permafrost distribution. Sellmann, P.V., et al. (1977, p.39-42) MP 925	Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al, [1980, 12p.] CR 80-11	et al, [1982, 25p.] SR 82-0
Iceberg thickness profiling using an impulse radar. Kovaca, A., (1977, p.140-142) MP 1012	Free convection heat transfer characteristics in a melt water layer. Yen, YC., [1980, p.550-556] MP 1311	Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59-75.
Difficulties of measuring the water saturation and porosity of	Atmospheric pollutants in snow cover runoff. Colbeck, S.C.,	75 ₁ NIF 196 Snow-cover characterization: SADARM support. O'Bries
snow. Colbeck, S.C., [1978, p.189-201] MP 1124 Simplified method for monitoring soil moisture. Walsh, J.E.,	[1981, p.1383-1388] MP 1487 Permeability of a melting snow cover. Colbeck, S.C., et al.	H., et al, [1984, p.409-411] MIP 289 Constraints and approaches in high latitude natural resource
et al, (1978, p.40-44) MP 1194 Construction and performance of platinum probes for meas-	(1982, p.904-908) MP 1565 Metal ice friction	sampling and research. Slaughter, C.W., et al. [1984, p.41-46] NP 201
urement of redox potential. Blake, B.J., et al, [1978, 8p.] SR 78-27	Ship resistance in thick brash ice. Mellor, M., [1980, p.305-321]	Numerical simulation of freeze-up on the Ottauquechee River. Calkins, D.J., [1984, p.247-277] MP 181
Photoelastic instrumentation-principles and techniques.	Ice characteristics in Whitefish Bay and St. Marys River in	Meteorological instruments
Roberts, A., et al. (1979, 153p.) SR 79-13 Determination of frost penetration by soil resistivity measure-	winter. Vance, G.P., [1980, 27p.] SR 80-32 Dynamic friction of bobaled runners on ice. Huber, N.P., et al. (1986) 250-1088	Meteorological measurements at Camp Ethan Allen Trainin Center, Vermont. Bates, R., [1982, p.77-112]

Metaerological instruments (cost.)	Notes on conducting the behavior setting survey by interview	Computer modeling of terrain modifications in the arctic and
Using a MicroCORA sounding system in the southern ocean. Andess, B.L., et al, (1982, 17p.) CR 82-28	method. Ledbetter, C.B., [1976, 33p.] SR 76-14 Window performance in extreme cold. Flanders, S.N., et al,	subarctic. Outcalt, S.L, et al., [1977, p.24-32] MP 971
US/USSR Weddell Polynya expedition, Upper air data, 1981.	[1982, 21p.] CR 82-38	Hydraulic model investigation of drifting snow. Wucbler, J.L., [1978, 29p.] CR 78-16
Andreas, E.L., (1983, 288p.) SR 83-13 Boom for shipboard deployment of meteorological instru-	Utility services for remote military facilities. Reed, S.C., et al, [1984, 66p.] SR 84-14	Lysimeters validate wastewater renovation models. lakan-
ments. Andress, B.L., et al., [1983, 14p.] SR 83-28	Secondary stress within the structural frame of DYE-3: 1978- 1983. Ueda, H.T., et al, [1984, 44p.] SR 84-26	dar, I.K., et al, [1978, 11p.] SR 78-12 Resiliency of silt under asphalt during freezing and thawing.
Atmospheric dynamics in the antarctic marginal ice zone. Andreas, E.L., et al, [1984, p.649-661] MP 1667	Military operation	Johnson, T.C., et al, (1978, p.662-668) MP 1106 Regulation and the deformation of wet snow. Colbeck, S.C.,
Simple boom for use in measuring meteorological data from a ship. Andreas, E.L., et al., [1984, p.227-237,	Arctic environmental factors affecting army operations. Sat- er, J.B., ed., (1962, 11p.; MP 984	et al, [1978, p.639-650] MP 1172
MP 1752	Defensive works of subarctic snow. Johnson, P.R., 1977, 23p., CR 77-96	Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., ed, (1979, 432p.) SR 79-36
Motocrology Problems of the seasonal sea ice zone. Weeks, W.F., [1980,	Projectile and fragment penetration into ordinary snow.	Acoustic emission response in polycrystalline materials. St.
p.1-35 ₁ MP 1293	Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K.,	Modeling of ice in rivers. Ashton, G.D., (1979, p.14/1-
Cold Regions Science and Technology Bibliography. Cummings, N.H., [1981, p.73-75] MP 1372	[1978, p.1-239-1-262] MP 926 Riffects of winter military operations on cold regions terrain.	14/26 MP 1335 Multi year pressure ridges in the Canadian Beaufort Sea.
Microbiology Fate of crude and refined oils in North Slope soils. Sexstone,	Abele, G., et al, [1978, 34p.] SR 78-17	Wright, B., et al, [1979, p.107-126] MIP 1229
A., et al, [1978, p.339-347] MP 1186	Snow Symposium, 1st, Hanover, NH, Aug. 1981. (1982, 324p.) SE 82-17	Volumetric constitutive law for snow. Brown, R.L., 1980, p. 161-165; MP 1863
Bacterial aerosols resulting from wastewater irrigation in Ohio. Bausum, H.T., et al, [1979, 64p.] SR 79-32	Frozen soil characteristics that affect land mine functioning. Richmond, P.W., (1983, 18p.) SR 83-85	Problems of the sessonal sea ice zone. Weeks, W.F., 1980, p.1-351 MP 1293
Choenofiagellates from the Weddell Sea. Buck, K.R., 1981, p.47-541	SNOW-ONE-B data report. Bates, R.E., ed., 1983,	Sea ice growth, drift, and decay. Hibler, W.D., III, 1980,
See ice microbial communities in Anterctics. Garrison,	284p.; SR 83-16 Operation of the U.S. Combat Support Boat (USCSBMK 1)	p.141-209; MP 1296 Hydrologic modeling from Landaat land cover data.
D.L., et al, [1986, p.243-250] MP 2026 Microclimatelegy	on an ice-covered waterway. Stubstad, J., et al, [1984,	McKim, H.L., et al, [1984, 19p.] SR 84-01
Abiotic overview of the Tundra Biome Program, 1971.	Observations during BRIMFROST '83. Bouzoun, J.R., et al.	Ocean circulation: its effect on seasonal sea-ice simulations. Hibler, W.D., III, et al, [1984, p.489-492] MP 1786
Weller, G., et al, (1971, p.173-181) MP 906 Micrometeorological investigations near the tundra surface.	[1984, 36p.] SR 84-16 SNOW-TWO data report. Volume 2: System performance.	Heat and moisture transfer in frost-heaving soils. G.L., et al., [1984, p.336-343] MP 1765
Kelley, J.J., [1973, p.109-126] MIP 1996	Jordan, R., ed, (1984, 417p.) SR 84-20	Cazenovia Creek Model data acquisition system. Bennett,
Land treatment climatic survey at CRREL. Bilello, M.A., et al, [1978, 37p.] SR 78-21	Field sampling of snow for chemical obscurants at SNOW- TWO/Smoke Week VI. Cragin, J.H., t1984, p.265-270;	B.M., et al, [1985, p.1424-1429] MIP 2090 Instrumentation for an uplifting ice force model. Zabilanaky,
Microelement contest Urban waste as a source of heavy metals in land treatment.	MP 2896 Helicopter snow obscuration sub-test. Ebersole, J.F.,	L.J., (1985, p.1430-1435) MCP 2091
Iskandar, I.K., (1976, p.417-432) MP 977	(1984, p.359-376) MP 2094	Melsture CRRBL roof moisture survey, Pease AFB. Korhones, C., et
Riemental compositions and concentrations of microspherules in snow and pack ice from the Weddell Sea.	Snow-cover characterization: SADARM support. O'Brien, H., et al, [1984, p.409-411] MP 2095	al, [1977, 10p.] SR 77-82 Infrared detective: thermograms and roof moisture. Kor-
Kumai, M., et al, [1983, p.128-131] MP 1777	Effects of snow on vehicle-generated seismic signatures. Albert, D.G., 1984, p.83-109; MP 2874	honen, C., et al, [1977, p.41-44] MP 961
Microscopy Producing strain-free flat surfaces on single crystals of ice:	Change in orientation of artillery-delivered anti-tank mines in	Detection of moisture in construction materials. Morey, R.M., et al, [1977, 9p.] CR 77-25
comments. Tobin, T.M., [1973, p.519-520] MP 1000	snow. Bigl, S.R., [1984, 20p.] CR 84-29 Effect of snow on vehicle-generated seismic signatures. Al-	CRREL roof moisture survey, Building 208 Rock Island Arse-
Microstructure	bert, D.G., [1984, 24P.] CR 84-23	nal. Korhonen, C., et al, [1977, 6p.] SE 77-43 Effects of moisture and freeze-thaw on rigid thermal insula-
Acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al, [1981, p.385-394]	P.W., (1984, 12p.) CR 84-25	tions. Kaplar, C.W., [1978, p.403-417] MP 1005 Detecting wet roof insulation with a hand-held infrared cam-
MP 1455 Ice crystal formation and supercooled fog dissipation.	Prozen precipitation and weather, Munchen/Riem, West Germany. Bilello, M.A., [1984, 47p.] SR 84-32	era. Korhonen, C., et al. [1978, p.A9-A15]
Kumai, M., [1982, p.579-587] MP 1539	Workshop on Ice Penetration Technology, Hanover, NH,	MP 1213 Infrared thermography of buildings—a bibliography with ab-
Polycrystalline ice creep in relation to applied stresses. Cole, D.M., {1983, p.614-621 ₁ MP 1582	Penetration of shaped charges into ice. Melior, M., [1984,	stracts. Marshall, S.J., [1979, 67p.] SR 79-01 Drainage and frost action criteria for a pavement design.
Crystalline structure of ures ice sheets used in modeling in the	p.137-148 ₁ MP 1995 Overview of meteorological and snow cover characterization	Berg, R.L., [1979, 51p.] SR 79-15
CRREL test basin. Gow, A.J., (1984, p.241-253) MP 1835	at SNOW-TWO. Batos, R.B., et al, [1984, p.171-191, MP 1868	Roof moisture survey—U.S. Military Academy. Korhonen, C., et al, [1979, 8 refs.] SR 79-16
Effect of size on stresses in shear flow of granular materials, Pt.1. Shen, H.H., (1985, 18p.) CR 85-62	Snow Symposium, 4th, Hanover, NH, Vol.1. [1984, 433p.]	Roofs in cold regions. Tobiasson, W., [1980, 21p.]
Effect of size on stresses in shear flow of granular materials, Pt.2. Shen, H.H., [1985, 20p.] CR 85-03	SR 84-35 Tank B/O sensor system performance in winter: an overview.	Window performance in extreme cold. Flanders, S.N., et al.
Microwaves	Lacombe, J., et al, [1985, 26p.] MP 2073	[1981, p.396-408] MP 1393 Roof moisture surveys. Tobiasson, W., et al, [1981, 18p.]
Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, [1976, p.53-76] MF 1378	Clear improvement in obscuration. Palmer, R.A., r1985, p.476-477; MP 2867	SR 81-31
Interaction of a surface wave with a dielectric slab discon-	Snow in the construction of ice bridges. Coutermarsh, B.A., et al, [1985, 12p.] SR 85-18	Can wet roof insulation be dried out. Tobiasson, W., et al. [1983, p.626-639] MP 1969
tinuity. Arcone, S.A., et al, [1978, 10p.] CR 78-08 Disinfection of wastswater by microwaves. Iskandar, I.K., et	Sorption of military explosive contaminants on bentonite	Condensation control in low-slope roofs. Tobiasson, W., [1985, p.47-59] MP 2039
al, [1980, 15p.] SM 39-01	Military research	Vapor drive maps of the U.S.A. Tobiasson, W., et al, [1986,
Inlet current measured with Sessat-1 synthetic aperture radar. Shemdin, O.H., et al, [1980, p.35-37] MP 1443	Ice penetration tests. Garcia, N.B., et al, [1985, p.223-236] MP 2014	7p. + graphs; MP 2041 Moleture detection
Antarctic sea ice microwave signatures. Comiso, J.C., et al, [1984, p.662-672] MP 1668	Military transportation	Hand-held infrared systems for detecting roof moisture.
Dielectric properties at 4.75 GHz of saline ice slabs. Arcone,	Air-transportable Arctic wooden shelters. Flanders, S.N., et al, [1982, p.385-397] MP 1558	Roof moisture surveys. Tobiasson, W., [1982, p.163-166]
S.A., et al, (1985, p.83-86) MP 1911 Dielectric measurements of snow cover. Burns, B.A., et al,	Mineralogy	MP 1565 Moisture detection in roofs with cellular plastic insulation.
[1985, p.829-834] MP 1913 Remote sensing of the Arctic seas. Weeks, W.P., et al,	Examining antarctic soils with a scanning electron micro- scope. Kumai, M., et al, [1976, p.249-252] MP 931	Korhonen, C., et al, [1982, 22p.] SR 82-87
(1986, p.59-64) MP 2117	Mines (ordnance) Frozen soil characteristics that affect land mine functioning.	Infrared inspection of new roofs. Korhonen, C., [1982, 14p.] SR 82-33
Migration Brine zone in the McMurdo Ice Shelf, Antarctica. Kovaca,	Richmond, P.W., [1983, 18p.] SR 83-05	Roof moisture surveys: current state of the technology.
A., et al, [1982, p.166-171] MP 1550	Conventional land mines in winter. Richmond, P.W., [1984, 23p.] SR 84-30	Locating wet cellular plastic insulation in recently construct-
Military engineering Test of snow fortifications. Farrell, D.R., (1979, 15p.)	Mine detection in cold regions using short-pulse radar. Ar-	ed roofs. Korhonen, C., et al, 1983, p.168-173, MP 1729
SR 79-33	Mining	Comparison of serial to on-the-roof infrared moisture surveys.
Sessonal soil conditions and the reliability of the M15 land mine. Richmond, P.W., et al, [1984, 35p.] SR 84-18	Isua, Greenland: glacier freezing study. Ashton, G.D., [1978, p.256-264] MP 1174	U.S. Air Force roof condition index survey: Pt. Greely, Alas-
Conventional land mines in winter. Richmond, P.W., [1984, 23p.] SR 84-30	Models	ka. Coutermarsh, B.A., [1984, 67p.] SR 84-83 Roof moisture surveys: yesterday, today and tomorrow.
Cold factor. Abels, G., [1985, p.480-481] MP 2024		Tobiaseon, W., et al., (1985, p.438-443 + figs.)
Military equipment Besspirite design and performance: mortar stability report.	Abiotic overview of the Tundra Biome Program, 1971.	Aerial roof moisture surveys. Tobiasson, W., [1985, p.424-
Aitken, G.W., [1977, 28p.] CR 77-22	Ice forces on model structures. Zabilansky, L.J., et al,	425 ₁ MIP 2022
Snow and snow cover in military science. Swinzow, G.K., (1978, p.1-239-1-262) MP 926	(1975, p.400-407) MCP 863	Airborne roof moisture surveys. Tobiasson, W., 1986, p.45-47 ₁ MP 2139
Radial tire demonstration. Liston, R.A., [1985, p.281-	(1975, p.387-396) MP 864	Lessons learned from examination of membrane roofs in Alas- ka. Tobiasson, W., et al. [1986, p.277-290]
Performence based tire specification system for military	Ackley, S.F., et al, [1976, 25p.] CR 76-18	MP 2003
wheeled vehicles. Blaisdeli, G.L., (1985, p.277-280) MP 2101	Generation of runoff from subsectic snowpacks. Dunne, T.,	Meisture meters Hand-held infrared systems for detecting roof moisture.
Military facilities	Computer program for determining electrical resistance in	Tobiasson, W., et al. [1977, p.261-271] MP 1390 Lysimeters validate wastewater renovation models. lakan-
Wastewater treatment in cold regions. Sletten, R.S., et al. [1976, 15p.] MP 965	nonhomogeneous ground. Arcone, S.A., [1977, 16p.] CR 77-02	
• " • •		

Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] SR 78-01	Nutrient cycle Uptake of nutrients by plants irrigated with wastewater.	Ice distribution and winter surface circulation, Kachemak Bay, Alaska. Gatto, L.W., (1981, p.995-1001) MP 1442
Meleture transfer Energy belence and runoff from a subarctic snowpack.	Clapp, C.E., et al, [1978, p.395-404] MIP 1151 Adaptability of forage grasses to wastewater irrigation.	loe distribution and winter ocean circulation, Kachemak Bay,
Price, A.G., et al, [1976, 29p.] CR 76-27 Tracer movement through snow. Colbeck, S.C., [1977,	Palazzo, A.J., et al, [1978, p.157-163] MP 1153 Nitrogen in an overland flow wastewater treatment system.	Alaska. Gatto, L.W., [1981, 43p.] CR 81-22 Ice growth and circulation in Kachemak Bay, Alaska. Daly,
p.255-262; MP 1093 Maintaining buildings in the Arctic. Tobiasson, W., et al,	Chen, R.L., et al, [1980, 33p.] SR 80-16 Model for nitrogen behavior in land treatment of wastewater.	S.F., 1982, p.(C)1-(C)9; MP 1561 Ice distribution and water circulation, Kachemak Bay, Alaska.
(1977, p.244-251) MP 1506	Selim, H.M., et al, [1980, 49p.] CR 80-12	Gatto, L.W., [1982, p.421-435] MP 1569 Effects of conductivity on high-resolution impulse radar
Research on roof moisture detection. Tobiasson, W., et al. [1978, 6p.] SR 78-29	Dynamics of NH4 and NO3 in cropped soils irrigated with wastewater. Iskandar, I.K., et al, [1980, 20p.]	sounding. Morey, R.M., et al, [1982, 12p.]
Roof moisture survey. Korhonen, C., et al, [1980, 31p.] SR 80-14	SR 80-27 Arctic ecosystem: the coastal tundra at Barrow, Alaska.	Ocean circulation: its effect on seasonal sea-ice simulations.
Moisture gain and its thermal consequence for common roof insulations. Tobiasson, W., et al, [1980, p.4-16]	Brown, J., ed, [1980, 571p.] MP 1355 Plant growth on a gravel soil: greenhouse studies. Palazzo,	Hibler, W.D., III, et al, [1984, p.489-492] MIP 1700 Ocean environments
MP 1361 Simple model of ice segregation using an analytic function to	A.J., et al, [1981, 8p.] SR 81-04	Choanofiageliata from the Weddell Sea, summer 1977. Buck, K.R., [1980, 26p.] CR 80-16
model heat and soil-water flow. Hromadka, T.V., II, et al,	Analysis of processes of primary production in tundra growth forms. Tieszen, L.L., et al, [1981, p.285-356]	Oceanography
[1984, p.99-104] MP 2104 Two-dimensional model of coupled heat and moisture trans-	MP 1433 Modeling N transport and transformations in soils. Selim,	Automatic data collection equipment for oceanographic application. Dean, A.M., Jr., [1978, p.1111-1121]
port in frost heaving soils. Guymon, G.L., et al, [1984, p.91-98] MP 1678	H.M., et al, [1981, p.233-241] MP 1446 Seasonal growth and uptake of nutrients by orchardgrass irri-	MP 1028 Coastal marine geology of the Beaufort, Chukchi and Bering
Heat and moisture transfer in frost-heaving soils. Guymon, G.L., et al, [1984, p.336-343] MP 1765	gated with wastewater. Palazzo, A.J., et al, [1981, 19p.]	Seas. Gatto, L.W., [1980, 357p.] SR 80-65 Physical oceanography of the seasonal sea ice zone.
Partial verification of a thaw settlement model. Guymon, G.L., et al. [1985, p.18-25] MP 1924	Modeling nitrogen transport and transformations in soils: 2.	McPhee, M.G., [1980, p.93-132] MP 1294 Problems of the seasonal sea ice zone. Weeks, W.F., [1980,
Monitors	Validation. Iakandar, I.K., et al, [1981, p.303-312] MP 1441	p.1-35 ₁ MIP 1293
Automatic data collection equipment for oceanographic application. Dean, A.M., Jr., [1978, p.1111-1121]	Seven-year performance of CRREL slow-rate land treatment prototypes. Jenkins, T.F., et al, [1981, 25p.]	International Workshop on the Seasonal Sea Ice Zone, Mon- terey, California, Feb. 26-Mar.1, 1979. Andersen, B.G.,
MP 1028 Moraines	SR \$1-12 Soil microbiology. Bosatta, E., et al, [1981, p.38-44]	ed, [1980, 357p.] MP 1292 Arctic Ocean temperature, salinity and density, March-May
Antarctic soil studies using a scanning electron microscope. Kumai, M., et al, [1978, p.106-112] MP 1386	MP 1753 Wastewater treatment by a prototype allow rate land treatment	1979. McPhee, M.G., [1981, 20p.] SR 81-65 Mesoscale air-ice-ocean interaction experiments. Johan-
Diamictons at the margin of the Matanuska Glacier, Alaska.	system. Jenkins, T.F., et al, [1981, 44p.] CR 81-14	ncesen, O.M., ed, [1984, 176p.] SR 84-29 Offshore drilling
Lawson, D.E., [1981, p.78-84] MP 1462 Messes	Effect of soil temperature on nitrification kinetics. Parker, L.V., et al, [1981, 27p.] SR \$1-33	Delineation and engineering characteristics of permafrost
Tundra environment at Barrow, Alaska. Bunnell, F.L., et al, [1975, p.73-124] MP 1050	Overview of models used in land treatment of wastewater. Iskardar, I.K., [1982, 27p.] SR 82-61	beneath the Beaufort Sea. Sellmann, P.V., et al, [1976, p.391-408] MP 1377
Motor vehicles	U.S. tundra biome publication list. Brown, J., et al, [1983,	Operational report: 1976 USACRREL-USGS subsea perma- frost program Beaufort Sea, Alaska. Sellmann, P.V., et al,
Winter air pollution at Fairbanka, Alaska. Coutts, H.J., et al, [1981, p.512-528] MP 1395	29p. ₁ SR 83-29 Ocean bottom	[1976, 20p.] SR 76-12 Delineation and engineering characteristics of permafrost
Shallow snow model for predicting vehicle performance. Harrison, W.L., [1981, 21p.] CR 81-28	Hyperbolic reflections on Beaufort Sea seismic records. Neave, K.G., et al, [1981, 16p.] CR 81-02	beneath the Beaufort Sea. Sellmann, P.V., et al, [1976, p.53-60] MP 919
Vehicle for cold regions mobility measurements. Blaisdell, G.L., [1985, p.9-20] MP 2944	Subsea trenching in the Arctic. Mellor, M., [1981, p.843-882] MP 1464	Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al., (1977,
Field demonstration of traction testing procedures. Blais-	Subsea trenching in the Arctic. Mellor, M., [1981, 31p.]	p.432-440 ₃ MIP 1077
Winter tire tests: 1980-81. Blaisdell, G.L., et al, 1985,	CR 81-17 Site investigations and submarine soil mechanics in polar re-	1977 CRREL-USGS permafrost program Beaufort Sea, Alas- ka, operational report. Sellmann, P.V., et al, [1977, 19p.]
p.135-151 ₁ MP 2045 ISTVS workshop on tire performance under winter condi-	gions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes.	SR 77-41 Problems of offshore oil drilling in the Besufort Ses. Weller,
tions, 1983. _[1985, 177p.] SR 85-15 Municipal engineering	[1982, 141p.] SR 83-25 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks,	G., et al, [1978, p.4-11] MP 1250 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska.
Pothole primer; a public administrator's guide to understand-	W.F., et al, [1983, 34p. + map] CR 83-21	Blouin, S.E., et al, [1979, 45p.] CR 79-67 Distribution and properties of subsea permafrost of the Beau-
ing and managing the pothole problem. Eaton, R.A., coord, [1981, 24p.] MP 1416	Some probabilistic aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea. Weeks, W.F., et al. [1984, p.213-	fort Sea. Sellmann, P.V., et al, [1979, p.93-115] MP 1287
Natural resources Cold climate utilities delivery design manual. Smith, D.W.,	2367 MP 1838 Subsea permafrost distribution on the Alaskan shelf. Sell-	Permafrost beneath the Beaufort Sea: near Prudhoe Bay,
et al, [1979, c300 leaves] MP 1373 Constraints and approaches in high latitude natural resource	mann, P.V., et al, [1984, p.75-82] MP 1852 Study of sea ice induced gouges in the sea floor. Weeks,	Alaska. Selimann, P.V., et al, [1980, p.35-48] MP 1346
sampling and research. Slaughter, C.W., et al, 1984, p.41-461 MP 2013	W.F., et al, [1985, p.126-135] MP 1917 Mapping resistive seabed features using DC methods. Sell-	Problems of the seasonal sea ice zone. Weeks, W.F., [1980, p.1-35] MP 1293
Offshore oil in the Alaskan Arctic. Weeks, W.F., et al. [1984, p.371-378] MIP 1743	mann, P.V., et al, [1985, p.136-147] MIP 1918	Site investigations and submarine soil mechanics in polar re- gions. Chamberlain, E.J., [1981, 18p.] SR 81-24
Navigation	Numerical simulation of sea ice induced gouges on the shelves of the polar oceans. Weeks, W.F., et al., [1985, p.259-	Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25
Helicopter snow obscuration sub-test. Ebersole, J.F., [1984, p.359-376] MP 2094	265 ₁ MP 1938 Ice gouge hazard analysis. Lanan, G.A., et al, (1986, p.57-	Offshore mechanics and Arctic engineering, symposium,
Nitrate deposits Nitrate fluctuations in antarctic snow and firm. Parker, B.C.,	66 ₁ MF 2106 Ocean currents	1983. [1983, 813p.] MP 1581 Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks,
et al. (1982, p.243-248) MP 1551 Nitregen	Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto,	W.F., et al, [1983, 34p. + map] CR 83-21 Offshore oil in the Alaskan Arctic. Weeks, W.F., et al,
Mathematical simulation of nitrogen interactions in soils.	Circulation and sediment distribution in Cook Inlet, Alaska.	(1984, p.371-378) MP 1743 Offshore Mechanics and Arctic Engineering Symposium, 4th,
Selim, H.M., et al, [1983, p.241-248] MP 2051 Nitregen isotopes	Gatto, L.W., [1976, p.205-227] MP 895 Baseline data on the oceanography of Cook Inlet, Alaska.	1985. [1985, 2 vols.] MP 2185 Topical databases: Cold Regions Technology on-line. Lis-
Methodology for nitrogen isotope analysis at CRREL. Jenkins, T.F., et al, [1978, 57p.] SR 78-08	Gatto, L.W., [1976, 84p.] CR 76-25 Radar anisotropy of sea ice. Kovacs, A., et al, [1978, p.171-	ton, N., et al, [1985, p.12-15] MIP 2027
Noise (sound) Audibility within and outside deposited snow. Johnson, J.B.,	201; MP 1111 Preferred crystal orientations in Arctic Ocean fast ice.	Offshore Mechanics and Arctic Engineering Symposium, 5th, 1986. [1986, 4 vols.] MP 2031
(1985, p.136-142) MP 1960	Weeks, W.F., et al, [1978, 24p.] CR 78-13	Offshere structures Structures in ice infested water. Assur, A., [1972, p.93-97]
Nextles Heat transfer between water jets and ice blocks. Yen, YC.,	Radar anisotropy of sea ice. Kovacs, A., et al, [1978, p.6037-6046] MP 1139	MP 1616 Investigation of ice forces on vertical structures. Hirayama,
[1976, p.299-307] MP 882 Nuclear explosions	Some results from a linear-viscous model of the Arctic ice cover. Hibler, W.D., III, et al, [1979, p.293-304]	K., et al, [1974, 153p.] MP 1041 Statistical variations in Arctic sea ice ridging and deformation
Analysis of explosively generated ground motions using Fourier techniques. Blouin, S.E., et al, [1976, 86p.]	MIP 1241 Anisotropic properties of sea ice. Kovacs, A., et al, (1979,	rates. Hibler, W.D., III, [1975, p.J1-J16] MP 850
CR 76-28	p.5749-5759 ₁ MP 1258	Ice forces on simulated structures. Zabilansky, L.J., et al. [1975, p.387-396] MP 864
Prediction of explosively driven relative displacements in rocks. Blouin, S.E., [1981, 23p.] CR \$1-11	Crystal alignments in the fast ice of Arctic Alaska. Weeks, W.F., et al, [1979, 21p.] CR 79-22	Yukon River breakup 1976. Johnson, P., et al, [1977, p.592-596] NIP 966
Nuclear magnetic resonance NMR phase composition measurements on moist soils.	Crystal alignments in the fast ice of Arctic Alaska. Weeks, W.F., et al, [1980, p.1137-1146] MIP 1277	Horizontal forces exerted by floating ice on structures. Kerr, A.D., [1978, 9p.] CR 78-15
Tice, A.R., et al. [1978, p.11-14] MP 1210 Unfrozen water contents of submarine permafrost determined	Physical properties of sea ice and under-ice current orienta- tion. Kovacs, A., et al, [1980, p.109-153] MP 1323	Ice laboratory facilities for solving ice problems. Franken- stein, G.E., [1980, p.93-103] MP 1301
by nuclear magnetic resonance. Tice, A.R., et al, [1980, p.400-412] MP 1412	Oceanic boundary-layer features and oscillation at drift sta- tions. McPhee, M.G., [1980, p.870-884] MP 1369	Site investigations and submarine soil mechanics in polar re-
Relationship between the ice and unfrozen water phases in	Sea ice anisotropy, electromagnetic properties and strength.	gions. Chamberlain, E.J., (1981, 18p.) SR 81-24 Foundations of structures in polar waters. Chamberlain,
frozen soil. Tice, A.R., et al, [1982, 8p.] CR 82-15 Effects of magnetic particles on the unfrozen water content in	Kovacs, A., et al, [1980, 18p.] CR 86-20 Injet current measured with Seasat-1 synthetic aperture radar.	E.J., [1981, 16p.] SR 81-25 Sea ice rubble formations in the Bering Sea and Norton
soils. Tice, A.R., et al, (1984, p.63-73) MP 1790 Soil-water potential and unfrozen water content and tempera-	Shemdin, O.H., et al. [1980, p.35-37] MP 1481 Review of sea-ice weather relationships in the Southern Hem-	Sound, Alaska. Kovacs, A., [1981, 23p.] SR 81-34 Dynamic ice-structure interaction during continuous crush-
ture. Xu, X., et al, (1985, p.1-14) MP 1932	isphere. Ackley, S.F., [1981, p.127-159] MP 1426	ing. Manttanen, M., (1983, 48p.) CR 83-05

Offshere structures (cont.) Offshere mechanics and Arctic engineering, symposium,	Surface disturbance and protection during economic development of the North. Brown, J., et al, [1981, 88p.]	Characterization of snow for evaluation of its effect on elec- tromagnetic wave propagation. Berger, R.H., (1983,
1983, [1983, 813p.] MP 1581 Method for determining ice loads on offshore structures.	NIP 1467 Long-term active layer effects of crude oil spilled in interior	p.35-42; MP 1646 Frazil ice formation. Ettema, R., et al, [1984, 44p.] CR 84-16
Johnson, J.B., [1983, p.124-128] MP 2056	Alaska. Collins, C.M., [1983, p.175-179] MP 1656	
Ice forces on model marine structures. Haynes, F.D., et al, [1983, p.778-787] MP 1666	Optical properties Photoelastic instrumentation—principles and techniques.	Effect of size on stresses in shear flow of granular materials Pt.1. Shen, H.H., [1985, 18p.] CR 85-63
Protection of offshore arctic structures by explosives. Mel-	Roberts, A., et al, [1979, 153p.] SR 79-13	Effect of size on stresses in shear flow of granular materials Pt.2. Shen, H.H., [1985, 20p.] CR 85-63
Characteristics of multi-year pressure ridges. Kovacs, A.,	Catalog of smoke/obscurant characterization instruments. O'Brien, H.W., et al, [1984, p.77-82] MP 1865	Statistics of coarsening in water-saturated snow. Colbeck
[1983, p.173-182] MP 1698 Measurement of ice forces on structures. Sodhi, D.S., et al,	Thermal emissivity of diathermanous materials. Munis, R.H., et al, [1985, p.872-878] MP 1963	S.C., [1986, p.347-352] MP 2015 Frazil ice measurements in CRREL's flume facility. Daly
[1983, p.139-155] MP 1641	Organic solls	S.F., et al, [1986, p.427-438] MIP 2127
Offshore petroleum production in ice-covered waters. Tuck- er, W.B., 1983, p.207-215; MP 2886	Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29] MP 1356	Particles Elemental compositions and concentrations of micros
Ice scoring on the Alaskan shelf of the Beaufort Sea. Weeks,	Arctic ecosystem: the coastal tundra at Barrow, Alaska.	pherules in snow and pack ice from the Weddell Sea
W.F., et al, [1983, 34p. + map] CR 83-21 lee action on pairs of cylindrical and conical structures.	Brown, J., ed. [1980, 571p.] MIP 1355 Oscillations	Kumai, M., et al, [1983, p.128-131] MP 1?77 Forward-scattering corrected extinction by nonspherical par-
Kato, K., et al, [1983, 35p.] CR 83-25 Offshore mechanics and Arctic engineering symposium,	Oceanic boundary-layer features and oscillation at drift sta-	ticles. Bohren, C.F., et al, [1985, p.1023-1029] MP 1986
1984. [1984, 3 vois.] MIP 1675	tions. McPhoe, M.G., [1980, p.870-884] MP 1369 Oxygen isotopes	PATTERNED GROUND
loe action on two cylindrical structures. Kato, K., et al, [1984, p.107-112] MIP 1741	Oxygen isotope profiles through ice sheets. Johnsen, S.J., et	Patterned ground in Alaska. Péwé, T.L., et al, [1969, 87p.] MP 1186
Dependence of crushing specific energy on the aspect ratio	al, [1972, p.429-434] MP 997 Oxygen isotopes in the basal zone of Matanuska Glacier.	Patterned ground
and the structure velocity. Sodhi, D.S., et al, [1984, p.363-374] MP 1708	Lawson, D.E., et al, (1978, p.673-685) MP 1177 Pack ice	Morphology of the North Slope. Walker, H.J., [1973, p.49- 52] MP 1004
Atmospheric icing on sea structures. Makkonen, L., 1984, 92p.; M 84-02	Meso-scale strain measurements on the Beaufourt sea pack	Pavement bases
Assessment of ice accretion on offshore structures. Minsk,	ice (AIDJEX 1971). Hibler, W.D., III, et al, [1974, p.119-138] MIP 1035	Pavement recycling using a heavy buildozer mounted pulver- izer. Eaton, R.A., et al, [1977, 12p. + appends.]
L.D., [1984, 12p.] SR 84-64 Icing rate on stationary structures under marine conditions.	Statistical variations in Arctic sea ice ridging and deformation	SR 77-30 Effect of freeze-thaw cycles on resilient properties of fine
Itagaki, K., [1984, 9p.] CR 84-12	rates. Hibler, W.D., III, [1975, p.J1-J16] MP 850 Movement of coastal sea ice near Prudhoe Bay. Weeks,	grained soils. Johnson, T.C., et al, [1978, 19p.]
Computational mechanics in arctic engineering. Sodhi, D.S., (1984, p.351-374) MP 2972	W.F., et al, [1977, p.533-546] MP 1066	MP 1662 Preeze thaw effect on resilient properties of fine soils. John
Buckling analysis of cracked, floating ice sheets. Adley, M.D., et al, [1984, 28p.] SR 84-23	loe arching and the drift of pack ice through restricted chan- nels. Sodhi, D.S., [1977, 11p.] CR 77-18	son, T.C., et al, [1979, p.247-276] MIP 1226
Ice forces on rigid, vertical, cylindrical structures. Sodhi,	Modeling pack ice as a viscous-plastic continuum. Hibler, W.D., III, [1977, p.46-55] MP 1164	Pavements Plexible pavement resilient surface deformations. Smith, N.
D.S., et al, [1984, 36p.] CR 84-33 Offshore Mechanics and Arctic Engineering Symposium, 4th,	Sea ice studies in the Weddell Sea region aboard USCGC	et al, [1975, 13 leaves] MIP 1264
1985. [1985, 2 vois.] MP 2105	Burton Island. Ackley, S.F., [1977, p.172-173] MP 1014	Influence of insulation upon frost penetration beneath pave ments. Eaton, R.A., et al, [1976, 41p.] SR 76-90
Sheet ice forces on a conical structure: an experimental study. Sodhi, D.S., et al, [1985, p.46-54] MP 1915	Dynamics of near-shore ice. Kovacs, A., et al, 1977,	Prost action in New Jersey highways. Berg, R.L., et al [1978, 80p.] SR 78-69
Arctic ice and drilling structures. Sodhi, D.S., [1985, p.63-69] MP 2119	p.563-510 ₁ MP 1290 Sea ice and ice algae relationships in the Weddell Sea. Ack-	Resiliency of silt under asphalt during freezing and thawing
Real-time measurements of uplifting ice forces. Zabilansky,	ley, S.F., et al, [1978, p.70-71] MP 1203	Johnson, T.C., et al, [1978, p.662-668] MP 1100 Nondestructive testing of in-service highway pavements in
L.J., [1985, p.253-259] MP 2092 Topical databases: Cold Regions Technology on-line. Lis-	Measurement of mesoscale deformation of Besufort ses ice (AIDJEX-1971). Hibler, W.D., III, et al, [1978, p.148-	Maine. Smith, N., et al, [1979, 22p.] CR 79-00
ton, N., et al, [1985, p.12-15] MP 2027	172 ₁ MP 1179 Effect of the oceanic boundary layer on the mean drift of pack	Drainage and frust action criteria for a pavement design Berg, R.L., [1979, 51p.] SR 79-15
Measurement of icing on offshore structures. Minak, L.D., [1985, p.287-292] MP 2016	ice: application of a simple model. McPhee, M.G., (1979,	Asphalt concrete for cold regions. Dempsey, B.I., et al
Kadluk ice stress measurement program. Johnson, J.B., et al,	p.388-400; NP 1198 Overview on the seasonal sea ice zone. Weeks, W.F., et al,	[1980, 55p.] CR 88-6: Mathematical model to correlate frost heav: pavements
[1985, p.88-100] MP 1899 Experience with a biaxial ice stress sensor. Cox, G.F.N.,	[1979, p.320-337] MIP 1320 International Workshop on the Seasonal Sea Ice Zone, Mon-	Berg, R.L., et al, [1980, 49p.] CR 88-16
[1985, p.252-258] MP 1937 Sheet ice forces on a conical structure: an experimental study.	terey, California, Feb. 26-Mar.1, 1979. Andersen, B.G.,	Field studies of membrane encapsulated soil layers with additives. Baton, R.A., et al, [1980, 46p.] SR 88-33
Sodhi, D.S., et al, [1985, p.643-655] MP 1906	ed, [1980, 357p.] MP 1292 Oceanic boundary-layer features and oscillation at drift sta-	Structural evaluation of porous pavement in cold climate Eaton, R.A., et al, [1980, 43p.] SR 88-39
Instrumentation for an uplifting ice force model. Zabilansky, L.J., (1985, p.1430-1435) MP 2091	tions. McPhee, M.G., [1980, p.870-884] MIP 1369	Pothole primer; a public administrator's guide to understand
Crushing of ice sheet against rigid cylindrical structures.	Sea-ice atmosphere interactions in the Weddell Sea using drifting buoys. Ackley, S.F., [1981, p.177-191]	ing and managing the pothole problem. Eaton, R.A. coord, (1981, 24p.) MP 1416
Ice cover research-present state and future needs. Kerr,	MP 1427 Condensate profiles over Arctic leads. Andreas, E.L., et al,	Pavement deflection after freezing and thawing. Chamber lain, E.J., [1981, 10p.] CR 81-15
A.D., et al, [1986, p.384-399] MP 2004 Impact ice force and pressure: An experimental study with	[1981, p.437-460] MIP 1479	lain, E.J., [1981, 10p.] CR 81-15 Guide to managing the pothole problem on roads. Eaton
urea ice. Sodhi, D.S., et al, [1986, p.569-576]	On modeling the Weddell Sea pack ice. Hibler, W.D., III, et al., (1982, p.125-130) MP 1549	R.A., et al, [1981, 24p.] SR 81-21 Potholes: the problem and solutions. Eaton, R.A., [1982,
MP 2037 Offshore Mechanics and Arctic Engineering Symposium, 5th,	Physical and structural characteristics of antarctic sea ice.	p.160-162 ₁ MP 1904
1986. [1986, 4 vols.] MIP 2031	Gow, A.J., et al, [1982, p.113-117] MIP 1548 Observations of pack ice properties in the Weddell Sea.	Full-depth and granular base course design for frost areas Eaton, R.A., et al, [1983, p.27-39] MP 1492
Some effects of friction on ice forces against vertical struc- tures. Kato, K., et al, [1986, p.528-533] MP 2036	Ackley, S.F., et al. 1982, p. 105-106; MP 1668 Relative abundance of diatoms in Weddell Sea pack ice.	Riflect of color and texture on the surface temperature of
Flexural and buckling failure of floating ice sheets against structures. Sodhi, D.S., [1986, p.339-359] MP 2134	Clarke, D.B., et al, [1983, p.181-182] MP 1786	asphalt concrete pavements. Berg, R.L., et al., (1983, p.57-61; MP 165;
Oil recovery	Surface roughness of Ross Sea pack ice. Govoni, J.W., et al, [1983, p.123-124] MP 1764	Comparison of two-dimensional domain and boundary inte- gral geothermal models with embankment freeze-thaw field
Offshore oil in the Alaskan Arctic. Weeks, W.F., et al, [1984, p.371-378] MIP 1743	Elemental compositions and concentrations of micros-	data. Hromadka, T.V., II, et al, [1983, p.509-513]
Oil spills	pherules in snow and pack ice from the Weddell Sea. Kumai, M., et al, [1983, p.128-131] MP 1777	MP 1659 Revised procedure for pavement design under sessonal fros
Ecological effects of oil spills and seepages in cold-dominated environments. McCown, B.H., et al., [1971, p.61-65]	Morphology and ecology of diatoms in sea ice from the Wed- deli Sea. Clarke, D.B., et al, [1984, 41p.] CR 84-05	conditions. Berg, R., et al, [1983, 129p.] SR 83-2. Prost heave of full-depth asphalt concrete pavements. Zom
MF 905 Oil spills on permafrost. Collins, C.M., et al, [1976, 18p.]	See ice data buoys in the Weddell Sea. Ackley, S.F., et al.	erman, I., et al, [1985, p.66-76] MP 192
SR 76-15	[1984, 18p.] CR 84-11 Sea ice penetration in the Arctic Ocean. Weeks, W.F.,	Seasonal variations in pavement performance. Johnson T.C., [1985, c21p.] MP 2076
Second progress report on oil spilled on permafrost. McFadden, T., et al, (1977, 46p.) SR 77-44	[1984, p.37-65] MP 1993	Hydraulic properties of selected soils. Ingersoll, J., et al
Fate of crude and refined oils in North Slope soils. Sexstone,	Heat and moisture advection over antarctic sea ice. Andress, E.L., [1985, p.736-746] MP 1888	[1985, p.26-35] MP 1925 Construction engineering community: materials and diagnos
A., et al, (1978, p.339-347) MP 1186 Crude oil spills on black spruce forest. Jenkins, T.F., et al,	Pad foundations	tics. [1986, 54p.] SR 86-0:
[1978, p.305-323] MP 1185 Plant recovery from Arctic oil spills. Walker, D.A., et al,	Construction on permafrost at Longyearbyen on Spitsbergen. Tobiasson, W., [1978, p.884-890] MP 1168	Survey of airport pavement distress in cold regions. Vinson T.S., et al, [1986, p.41-50] MP 200:
[1978, p.242-259] MIP 1184	Paleoclimatology Oxygen isotope profiles through ice sheets. Johnsen, S.J., et	Penetration Depth of water-filled crevasses of glaciers. Weertman, J.
Workshop on Ecological Effects of Hydrocarbon Spills in Alaska. Atlas, R.M., et al, [1978, p.155-157]	al, [1972, p.429-434] MIP 997	(1973, p.139-145) MP 1044
MP 1183 Tundra recovery since 1949 near Pish Creek, Alaska. Law-	Particle size distribution Measurement and identification of aerosols collected near	Icebreaking concepts. Mellor, M., [1980, 18p.] SR 88-0:
son, D.R., et al, [1978, 81p.] CR 78-28	Barrow, Alaska. Kumai, M., [1978, 6p.] CR 78-26	Surfacing submarines through ice. Assur, A., (1984, p.309-
Oil pooling under sea ice. Kovaca, A., [1979, p.310-323] MP 1289	Numerical simulation of atmospheric ice accretion. Ackley, S.F., et al, [1979, p.44-52] MP 1235	318 ₁ NIP 1990 Shopper's guide to ice penetration. Mellor, M., [1984, p.1-
Crude oil spills on subarctic permafrost in interior Alaska.	Snow and fog particle size measurements. Berger, R.H.,	35 ₁ MP 199
Johnson, L.A., et al, [1980, 128p.] MP 1310 Crude oil spills on subarctic permafrost in interior Alaska.	[1982, p.47-58] MP 1982 Palling snow characteristics and extinction. Berger, R.H.,	[1984, p.37-65] MP 199
Johnson, L.A., et al, [1980, 67p.] CR 80-29 Pooling of oil under sea ice. Kovaca, A., et al, [1981, p.912-	(1983, p.61-69) MP 1756 Snow characterization at SNOW-ONE-B. Berger, R.H., et	Penetration tests Brazil tensile strength tests on sea ice: a data report. Kovace
922 ₁ MP 1459	al, [1983, p.155-195] MP 1847	A., et al. (1977, 39p.) SR 77-2

Terminal ballistics in cold regions materials. Aitken, G.W.,	Vertically stable benchmarks: a synthesis of existing informa-	Climatic and dendroclimatic indices in the discontinuous per-
[1978, 6p.] MP 1182 Penetration tests in subsea permafrost, Prudhoe Bay, Alaska.	tion. Gatto, L.W., [1985, p.179-188] MP 2069 Ice-coring augers for shallow depth sampling. Rand, J.H., et	mafrost zone of the Central Alaskan Uplands. Haugen, R.K., et al, 1978, p.392-398 ₁ MP 1899
Blouin, S.E., et al, [1979, 45p.] CR 79-07	ai, [1985, 22p.] CR 85-21	Shallow electromagnetic geophysical investigations of perma-
Permafrost beneath the Beaufort Sea, near Prudhoe Bay, Alaska. Sellmann, P.V., et al, [1979, p.1481-1493]	Permatreet bases Dielectric properties of thawed active layers. Arcone, S.A.,	frost. Arcone, S.A., et al, [1978, p.501-507] MIP 1101
MP 1211	et al, [1982, p.618-626] MP 1547	Physical and thermal disturbance and protection of perma-
Determining subsea permafrost characteristics with a conc penctrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al,	Permetrost beneath rivers	frost. Brown, J., et al, (1979, 42p.) SR 79-85 Determining subsea permafrost characteristics with a cone
[1979, p.3-16] MP 1217	Piles in permafrost for bridge foundations. Crory, F.E., et al., (1967, 41p.) MP 1411	penetrometer-Prudhoe Bay, Alaska. Blouin, S.E., et al.
Subsea permafrost study in the Beaufort Sea, Alaska. Sell- mann, P.V., et al. (1979, p.207-213) MIP 1591	Runoff from a small subarctic watershed, Alaska. Chacho,	[1979, p.3-16] MP 1217 Permafrost distribution on the continental shelf of the Beau-
Bullet penetration in snow. Cole, D.M., et al, [1979, 23p.]	E.F., et al., [1983, p.115-120] MP 1654 Bank recession of the Tanana River, Alaska. Gatto, L.W.,	fort Sea. Hopkins, D.M., et al, [1979, p.135-141]
SR 79-25	[1984, 59p.] MP 1746	MP 1288 Distribution and properties of subsea permafrost of the Beau-
Test of snow fortifications. Farrell, D.R., [1979, 15p.] SR 79-33	Permafrest beneath reads	Distribution and properties of subsea permafrost of the Beau- fort Sea. Selimann, P.V., et al. [1979, p.93-115] MIP 1287
Permafrost beneath the Beaufort Sea: near Prudhoe Bay,	Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522	Electromagnetic surveys of permafrost. Arcone, S.A., et al,
Alaska. Scilmann, P.V., et al, [1980, p.35-48] MP 1346	Permafrost and active layer on a northern Alaskan road.	(1979, 24p.) CR 79-23
Dynamic ice-structure interaction analysis for narrow vertical	Berg, R.L., et al., (1978, p.615-621) MP 1102 Construction on permafrost at Longreurbyen on Spitubergen.	Postures of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, [1980, p.103-110] MP 1344
structures. Eranti, E., et al. (1981, p.472-479) MP 1456	Tobiasson, W., [1978, p.884-890] MP 1106	Distribution and features of bottom sediments in Alaskan
Deceleration of projectiles in snow. Albert, D.G., et al.	Haul Road performance and associated investigations in Alas- ka. Berg, R.L., [1980, p.53-100] MP 1351	coastal waters. Selimann, P.V., [1980, 50p.]
[1982, 29p.] CR 82-20 Mechanics of ice cover breakthrough. Kerr, A.D., [1984,	Effect of color and texture on the surface temperature of	Design of foundations in areas of significant frost penetration.
p.245-262 ₁ MP 1997	asphalt concrete pavements. Berg, R.L., et al., [1983, p.57-61] MP 1652	Linell, K.A., et al., (1980, p.118-184) MP 1358 Characteristics of permafrost beneath the Beaufort Sea. Seli-
Ice penetration tests. Garcia, N.B., et al, [1984, p.209-240] MP 1996	Permafrost beneath structures	mann, P.V., et al, [1981, p.125-157] MIP 1428
Workshop on Ice Penetration Technology, Hanover, NH,	Construction and performance of the Hess creek earth fill dam, Livengood, Alaska. Simoni, O.W., [1973, p.23-34]	Delineation and engineering of subsea permafrost, Beaufort Sea. Sellmann, P.V., et al, (1981, p.137-156)
June 12-13, 1984. [1984, 345p.] SR 84-33	MP 899	MP 1600
Penetration of shaped charges into ice. Mellor, M., [1984, p.137-148] MP 1995	Kotzebue hospital—a case study. Crory, F.E., [1978,	Drainage facilities of airfields and heliports in cold regions. Lobacz, E.P., et al. (1981, 56p.) SR 81-22
Penetremeters	p.342-359 ₁ MP 1684 Details behind a typical Alaskan pile foundation. Tobiasson,	Lobecz, E.P., et al, [1981, 56p.] SR 81-22 Surface disturbance and protection during economic develop-
Penetration tests in subsea permafrost, Prudhoe Bay, Alaska. Blouin, S.E., et al, [1979, 45p.] CR 79-67	W., et al, [1978, p.891-897] MIP 1109	ment of the North. Brown, J., et al, [1981, 88p.] NIP 1467
Determining subsea permafrost characteristics with a cone	Soviet construction under difficult climatic conditions. Assur, A., [1980, p.47-53] MP 1345	Seismic velocities and subsea permafrost in the Besufort Sea,
penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al, (1979, p.3-16) MP 1217	U.SSoviet seminar on building under cold climates and on	Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1665
PERIGLACIAL PROCESSES	permafrost. (1980, 365p.) SR 80-46 Design of foundations in areas of significant frost penetration.	Ice-cored mounds at Sukakpak Mountain, Brooks Range.
Patterned ground in Alaska. Péwé, T.L., et al, [1969, 87p.] MP 1186	Linell, K.A., et al, [1980, p.118-184] MP 1358	Brown, J., et al, [1983, p.91-96] MP 1653
Periglacial processes	Comparative analysis of the USSR construction codes and the	Relation: hips between estimated mean annual air and perma- frost temperatures in North-Central Alaska. Haugen,
Deposits in the glacial environment. Lawson, D.E., 1981,	US Army technical manual for design of foundations on permafrost. Fish, A.M., [1982, 20p.] CR 82-14	R.K., et al, [1983, p.462-467] MP 1658
16p.; CR 81-27 Periglacial landforms and processes, Kenai Mts., Alaska.	Conduction phase change beneath insulated heated or cooled structures. Lunardini, V.J., [1982, 40p.] CR 82-22	Potential responses of permafrost to climatic warming. Goodwin, C.W., et al, [1984, p.92-105] MP 1710
Bailey, P.K., (1985, 60p.) SR 85-63	structures. Lunardini, V.J., [1982, 40p.] CR 82-22 Thawing beneath insulated structures on permafrost. Lunar-	Subsea permafrost distribution on the Alaskan shelf. Sell-
Periodic variations	dini, V.J., (1983, p.750-755) MP 1662	mann, P.V., et al, [1984, p.75-82] MP 1852 Bank erosion, vegetation and permafrost, Tanana River near
20-yr oscillation in eastern North American temperature re- cords. Mock, S.J., et al, [1976, p.484-486] MP 889	Foundations on permafrost, US and USSR design and prac- tice. Fish, A.M., r1983, p.3-24; MP 1682	Fairbanks. Gatto, L.W., (1984, 53p.) SR 84-21
20-yr cycle in Greenland ice core records. Hibler, W.D., III.	Design implications of subsoil thawing. Johnson, T.C., et al,	Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et
et al, [1979, p.481-483] MP 1245 Forecasting ice formation and breakup on Lake Champlain.	[1984, p.45-103] MP 1766 Design and performance of water-retaining embankments in	al, [1984, p.237-258] MP 1839
Bates, R.E., et al, [1979, 21p.] CR 79-26	permafrost. Sayles, F.H., [1984, p.31-42] MP 1850	Permafrost, anow cover and vegetation in the USSR. Bigl, S.R., [1984, 128p.] SR 84-36
Nitrate fluctuations in antarctic snow and firm. Parker, B.C., et al, [1982, p.243-248] MP 1551	Foundations in permafrost and seasonal frost; Proceedings. [1985, 62p.] MP 1730	Periglacial landforms and processes, Kenni Mts., Alaska.
Modeling fluctuations of arctic sea ice. Hibler, W.D., III, et	Creep of a strip footing on ice-rich permafrost. Sayles, F.H.,	Bailey, P.K., [1985, 60p.] SR 85-63 Seismic surveys of shallow subsea permafrost. Neave, K.G.,
al, [1962, p.1514-1523] MP 1879 Permefreet	(1985, p.29-51) MP 1731	et al, [1985, p.61-65] MIP 1954
Workshop on permafrost-related research and TAPS. [1975,	U.S. permafrost delegation visit to China, July 1984. Brown, J., [1985, 137p.] SR 85-09	U.S. permafrost delegation visit to China, July 1984. Brown, J., [1985, 137p.] SR 85-89
37p. ₁ MP 1122 Dynamics and energetics of parallel motion tools for cutting	Heat transfer characteristics of thermosyphone with inclined	Prost jacking forces on H and pipe piles embedded in Pair-
and boring. Mellor, M., [1977, 85p.] CR 77-07	evaporator sections. Haynes, F.D., et al. (1986, p.285- 292) MP 2034	hanks silt. Johnson, J.B., et al, [1985, p.125-133] MP 1930
Numerical studies for an airborne VLF resistivity survey. Arcone, S.A., [1977, 10p.] CR 77-05	Permafrest control	Terrain analysis from space shuttle photographs of Tibet.
Arcone, S.A., [1977, 10p.] CR 77-05 Transverse rotation machines for cutting and boring in perma-	Light-colored surfaces reduce thaw penetration in permafrost. Berg, R.L., et al, (1977, p.86-99) MP 954	Kreig, R.A., et al. [1986, p.400-409] MIP 2897 Permatrust heat belience
frost. Mellor, M., [1977, 36p.] CR 77-19	Some experiences with tunnel entrances in permafrost. Li-	Cylindrical phase change approximation with effective ther-
Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] CR 80-14	nell, K.A., et al, [1978, p.813-819] MP 1107 Permafrect degradation	mal diffusivity. Lunardini, V.J., [1981, p.147-154] MP 1438
Mechanics of cutting and boring in permafrost. Mellor, M.,	Construction on permafrost at Longyearbyen on Spitsbergen.	Permafrest heat transfer
(1980, 82p.) CR 86-21 Environmental engineering, Yukon River-Prudhoe Bay Haul	Tobiasson, W., [1978, p.884-890] MP 1108	Evaluation of methods for calculating soil thermal conductivi-
Road. Brown, J., ed, [1980, 187p.] CR 80-19	Permafrost depth Electrical ground impedance measurements in Alaskan per-	ty. Farouki, O., (1972, 90p.) CR 82-08 Thermal properties of soils. Farouki, O.T., (1981, 136p.)
Environment of the Alaskan Haul Road. Brown, J., [1980, p.3-52] MP 1350	mafrost regions. Hoekstra, P., [1975, 60p.]	M \$1-01
Embankment dams on permafrost in the USSR. Johnson,	Permafrost beneath the Beaufort Sea, near Prudhoe Bay,	Conduction phase change beneath insulated heated or cooled structures. Lunardini, V.J., (1982, 40p.) CR 82-22
T.C., et al, [1980, 59p.] SR 80-41 Crude oil spills on subarctic permafrost in interior Alaska.	Alaska. Sellmann, P.V., et al, [1979, p.1481-1493] MP 1211	Computer models for two-dimensional steady-state heat con-
Johnson, L.A., et al., (1980, 67p.) CR 80-29	Distribution and features of bottom sediments in Alaskan	duction. Albert, M.R., et al, [1983, 90p.] CR 83-10 Formafreet hydrology
Cold Regions Science and Technology Bibliography. Cummings, N.H., (1981, p.73-75) MIP 1372	coastal waters. Sellmann, P.V., [1980, 50p.] SR 98-15	Morphology of the North Slope. Walker, H.J., [1973, p.49-
Tundra and analogous soils. Everett, K.R., et al, [1981,	Use of piling in frozen ground. Crory, F.B., [1980, 21 p.] MP 1467	52] MF 1004 Geophysical methods for hydrological investigations in per-
p.139-179; MP 1405		mafrost regions. Hockstra, P., (1976, p.75-90)
Mechanics of cutting and boring in permafrost. Mellor, M., [1981, 38p.] CR 81-26	CO2 effect on permafrost terrain. Brown, J., et al, [1982, 30p.] MP 1546	MP 932 Mars soil-water enalyzer: instrument description and status.
National Chinese Conference on Permafrost, 2nd, 1981.	Seismic velocities and subsea permafrost in the Beaufort Sea,	Anderson, D.M., et al, [1977, p.149-158] MP 912
Brown, J., et al., [1982, 58p.] SR 82-63 Bibliography on glaciers and permafrost, China, 1938-1979.	Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1665	Colloquium on Water in Planetary Regoliths, Hanover, N.H., Oct. 5-7, 1976. g1977, 161p.; MP 911
Shen, J., ed, [1982, 44p.] SR 82-20	Subsea permafrost distribution on the Alaskan shelf. Sell-	Fresh water supply for an Alaskan village. McFadden, T., et
Offshore mechanics and Arctic engineering, symposium, 1983, [1983, 813p.] MP 1581	mann, P.V., et al. (1984, p.75-82) MP 1852 Permefrest distribution	al, [1978, 18p.] SR 78-67 Proceedings of the second planetary water and polar pro-
Proceedings of the Symposium on Applied Glaciology, 2nd,	Permafrost and vegetation maps from ERTS imagery. And-	cesses colloquium, 1978. [1978, 209p.] MP 1193
1982. [1983, 314p.] MP 2054 Recovery and active layer changes following a tundra fire in	erson, D.M., et al. (1973, 75p.) MP 1003 ERTS mapping of Arctic and subarctic environments. And-	Case study: fresh water supply for Point Hope, Alasks. McFadden, T., et al, (1979, p.1029-1040) MIP 1222
northwestern Alaska. Johnson, L., et al, [1983, p.543-	erson, D.M., et al, [1974, 128p.] MP 1047	Design of foundations in areas of significant frost penetration.
547 ₁ MP 1666 Constraints and approaches in high latitude natural resource	Delineation and engineering characteristics of permafront beneath the Beaufort Sea. Sellmann, P.V., et al., 1977,	Linell, K.A., et al, (1980, p.118-184) MP 1358 Hydrology and climatology of a drainage besin near Pair-
sampling and research. Slaughter, C.W., et al, 1984,	p.385-395 ₁ NEP 1074	Hydrology and climatology of a drainage basin near Fairbanks, Alaska. Haugen, R.K., et al, (1982, 34p.). CR 82-26
p.41-46 _j MP 2013 Vegetation recovery in the Cape Thompson region, Alaska.	Evaluation of electrical equipment for measuring permafroat distribution. Selimann, P.V., et al. ¿1977, p.39-42 ₁	CR 82-26 Ice-cored mounds at Sukakpak Mountain, Brooks Range.
Everett, K.R., et al. (1985, 75p.) CR 85-11	MP 925	Brown, J., et al., (1983, p.91-96) MP 1653

Permafrost hydrology (cont.)	Permetrest structure	Phase change around insulated buried pipes: quesi-stead method. Lunardini, V.J., [1981, p.201-207]
Water migration due to a temperature gradient in frozen soil. Oliphant, J.L., et al, [1983, p.951-956] MP 1666	Morphology of the North Slope. Walker, H.J., [1973, p.49- 52] MP 1004	MP 149
Ground ice in perennially frozen sediments, northern Alaska.	Electrical resistivity profile of permafrost. Hockstra, P.,	Heat conduction with phase changes. Lunardini, V.J. [1981, 14p.] CR 81-2
Lawson, D.E., [1983, p.695-700] MP 1661 Permafreet indicators	[1974, p.28-34] MP 1045 Computer modeling of terrain modifications in the arctic and	Preezing of soil with surface convection. Lunardini, V.J.
Airborne E-phase resistivity surveys of permafrost. Sell-	subarctic. Outcalt, S.I., et al, [1977, p.24-32] MP 971	[1982, p.205-212] MP 159: Solution of two-dimensional freezing and thawing problems
mann, P.V., et al. [1974, p.67-71] MIP 1046 Geophysical methods for hydrological investigations in per-	Remote sensing of massive ice in permafrost along pipelines	O'Neill, K., [1983, p.653-658] MP 158
mafrost regions. Hoekstra, P., [1976, p.75-90] MP 932	in Alasks. Kovacs, A., et al, (1979, p.268-279) MP 1175	Approximate phase change solutions for insulated buried cyl inders. Lunardini, V.J., [1983, p.25-32] MP 159:
Selected examples of radiohm resistivity surveys for geotech-	Electromagnetic survey in permafrost. Sellmann, P.V., et al,	Boundary integral equation solution for phase change problems. O'Neill, K., (1983, p.1825-1850) MP 2007.
nical exploration. Hockstra, P., et al, [1977, 16p.]	(1979, 7p.) SR 79-14	lems. O'Neill, K., [1983, p.1825-1850] MP 289: Fixed mesh finite element solution for cartesian two-dimen
Pormafrost physics	Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.]	sional phase change. O'Neill, K., [1983, p.436-441]
Delineation and engineering characteristics of permafrost	SR 94-12	MP 178: Modeling two-dimensional freezing. Albert, M.R., 1984,
beneath the Besufort Sea. Sellmann, P.V., et al, ri977, p.385-395, MP 1974	Permafreet thermal properties Approach roads, Greenland 1955 program. [1959, 100p.]	45p. ₃ CR 84-10
Dynamic in-situ properties test in fine-grained permafrost.	MP 1522	Computation of porous media natural convection flow an phase change. O'Neill, K., et al, [1984, p.213-229]
Blouin, S.E., [1977, p.282-313] MP 963 Shallow electromagnetic geophysical investigations of perma-	Subsea permafrost study in the Beaufort Sea, Alaska. Sell- mann, P.V., et al, [1979, p.207-213] MP 1591	MIP 189
frost. Arcone, S.A., et al, [1978, p.501-507]	Crude oil spills on subarctic permafrost in interior Alaska.	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-46]
Geophysics in the study of permafrost. Scott, W.J., et al,	Johnson, L.A., et al, [1980, 128p.] MP 1310	MP 185
[1979, p.93-115] MIP 1266	Phase change around a circ-slar pipe. Lunardini, V.J., [1980, 18p.] CR 88-27	Photoelasticity Photoelastic instrumentation—principles and techniques
Remote sensing of massive ice in permafrost along pipelines in Alaska. Kovacs, A., et al, {1979, p.268-279,	Piling in frozen ground. Crory, F.E., [1982, p.112-124]	Roberts, A., et al. (1979, 153p.) SR 79-1:
MP 1175	MP 1722 Modifications of permafrost, East Oumalik, Alaska. Law-	Photogrammetry Remote measurement of sea ice drift. Hibler, W.D., III, e
Electromagnetic survey in permafrost. Sellmann, P.V., et al., [1979, 7p.] SR 79-14	son, D.E., [1982, 33p.] CR 82-36	al, [1975, p.541-554] MP 84
Heat transfer in cold climates. Lunardini, V.J., [1981,	Preezing and thawing: heat balance integral approximations. Lunardini, V.J., [1983, p.30-37] MP 1997	Photointerpretation
731p. ₁ MP 1435 VHF electrical properties of frozen ground near Point Barrow,	Approximate solution to conduction freezing with density	Antarctic sea ice dynamics and its possible climatic effects Ackley, S.F., et al, [1976, p.53-76] MP 137
Alaska. Arcone, S.A., et al, [1981. 18p.] CR 81-13	variation. Lunardini, V.J., [1983, p.43-45] MP 1998 Relationships between estimated mean annual air and perma-	Air photo interpretation of a small ice jam. DenHartog, S.I.
Measurements of ground resistivity. Arcone, S.A., 1982, p.92-110; MP 1513	frost temperatures in North-Central Alaska. Haugen,	[1977, p.705-719] MP 93: Aerial photointerpretation of a small ice jam. DenHartog
	R.K., et al, (1983, p.462-467) MP 1658 Ground ice in perennially frozen sediments, northern Alaska.	S.L., (1977, 17p.) SR 77-5
Laboratory measurements of soil electric properties between 0.1 and 5 GHz. Delaney, A.J., et al. [1982, 12p.] CR 82-10	Lawson, D.E., [1983, p.695-700] MP 1661	Aerial photography of Cape Cod shoreline changes. Gatto L.W., [1978, 49p.] CR 78-1:
Tundra soils on the Arctic Slope of Alaska. Everett, K.R.,	Brosion of perennially frozen streambanks. Lawson, D.B., (1983, 22p.) CR 83-29	River channel characteristics at selected ice jam sites in Ver
et al, (1982, p.264-280) MP 1552 Improving electric grounding in frozen materials. Delaney,	[1983, 22p.] CR 83-29 Potential responses of permafrost to climatic warming.	mont. Gatto, L.W., [1978, 52p.] CR 78-2: Historical shoreline changes along the outer coast of Can
A.J., et al, (1982, 12p.) SR 82-13	Goodwin, C.W., et al, [1984, p.92-105] MP 1718	Historical shoreline changes along the outer coast of Cap Cod. Gatto, L.W., [1979, p.69-90] MP 156;
Deformation and failure of frozen soils and ice due to stresses. Fish, A.M., [1982, p.419-428] MP 1553	Subsea permafrost distribution on the Alaskan shelf. Sell- mann, P.V., et al, [1984, p.75-82] MP 1852	Aerial photointerpretation for shoreline changes. Gatto L.W., [1980, p.167-170] MP 180;
Understanding the Arctic sea floor for engineering purposes.	Status of numerical models for heat and mass transfer in frost-	Wildlife habitat mapping in Lac qui Parle, Minnesota. Mer
[1982, 141p.] SR 83-25 Preezing of soil with surface convection. Lunardini, V.J.,	susceptible soils. Berg, R.L., [1984, p.67-71] MP 1851	ry, C.J., et al, (1984, p.205-208) MP 208: Photomacrographs
[1982, p.205-212] MP 1595	Prototype drill for core sampling fine-grained perennially	Photomacrography of artifacts in transparent materials
Computer models for two-dimensional steady-state heat conduction. Albert, M.R., et al, (1983, 90p.) CR 83-10	frozen ground. Brockett, B.E., et al, [1985, 29p.] CR 85-61	Marshall, S.J., [1976, 31p.] CR 76-40
Guidebook to permafrost and its features, northern Alaska.	U.S. permafrost delegation visit to China, July 1984. Brown,	Case for comparison and standardization of carbon dioxide
Brown, J., ed, [1983, 230p.] MP 1640	J., [1985, 137p.] SR 85-69 Review of analytical methods for ground thermal regime cal-	reference gases. Kelley, J.J., et al, [1973, p.163-181] MF 96
Offshore mechanics and Arctic engineering symposium, 1984, (1984, 3 vols.) MP 1675	culations. Lunardini, V.J., [1985, p.204-257]	Physical properties
Conductive backfill for improving electrical grounding in	MP 1922 Heat transfer characteristics of thermosyphons with inclined	Physical and structural characteristics of sea ice in McMurde Sound. Gow, A.J., et al, [1981, p.94-95] MP 1542
frozen soils. Sellmann, P.V., et al, [1984, 19p.] SR 84-17	evaporator sections. Haynes, F.D., et al, (1986, p.285-	Piers
Field dielectric measurements of frozen silt using VHF pulses. Arcone, S.A., et al, [1984, p.29-37] MP 1774	292 ₁ MIP 2034 Permefrest thickness	Arching of model ice floes at bridge piers. Calkins, D.J. [1978, p.495-507] MP 1134
Dielectric studies of permafrost. Arcone, S.A., et al, [1985,	Electrical ground impedance measurements in Alaskan per-	Ice forces on the Yukon River bridge-1978 breakup. John
p.3-5 _j MP 1951	mafrost regions. Hoekstra, P., [1975, 60p.] MP 1049	son, P.R., et al, [1979, 40p.] MP 1364 Tee action on pairs of cylindrical and conical structures
Workshop on Permafrost Geophysics, Golden, Colorado, 23- 24 October 1984. Brown, J., ed, [1985, 113p.]	Permeability	Kato, K., et al, (1983, 35p.) CR 83-2:
SR 85-05	Consolidating dredged material by freezing and thawing.	Ice forces on a bridge pier, Ottauquechee River, Vermont Sodhi, D.S., et al, (1983, 6p.) CR 83-3:
Galvanic methods for mapping resistive seabed features. Sellmann, P.V., et al., [1985, p.91-92] MP 1955	Chamberlain, E.J., [1977, 94p.] MP 978 Freeze thaw effect on the permeability and structure of soils.	Vibration analysis of the Yamachiche lightpier. Haynes
Strain rate effect on the tensile strength of frozen silt. Zhu, Y., et al, [1985, p.153-157] MP 1898	Chamberlain, E.J., et al, [1978 p.31-44] MIP 1000	F.D., [1986, p.238-241] MP 1989
Permatront preservation	Preeze thaw effect on the permeability and structure of soils. Chamberlain, E.J., et al, [1979, p.73-92] MP 1225	Piles in permafrost for bridge foundations. Crory, F.B., et al
Piles in permafrost for bridge foundations. Crory, F.E., et al.	Soil infiltration on land treatment sites. Abele, G., et al,	[1967, 41p.] MP 1411 Study of piles installed in poles snow. Kowaca A . 1976
[1967, 41p.] MIP 1411 Construction and performance of the Hess creek earth fill	[1980, 41p.] SR 88-36 Liquid distribution and the dielectric constant of wet snow.	Study of piles installed in polar snow. Kovaca, A., [1976, 132p.] CR 76-2:
dam, Livengood, Alaska. Simoni, O.W., [1973, p.23-34] MP 659	Colbeck, S.C., [1980, p.21-39] MIP 1349	Stake driving tools: a preliminary survey. Kovaca, A., et al [1977, 43p.] SR 77-1;
Thermoinsulating media within embankments on perennially	Soil hydraulic conductivity and moisture retention features. Ingersoil, J., [1981, 11p.] SR 81-62	Use of piling in frozen ground. Crory, F.B., (1980, 21 p.) MCP 146
frozen soil. Berg, R.L., [1976, 161p.] SR 76-03 Ecological and environmental consequences of off-road traf-	Evaluation of procedures for determining selected aquifer	Pile extraction MP 140
fic in northern regions. Brown, J., r1976, p.40-531	parameters. Daly, C.J., [1982, 104p.] CR \$2-41	Ice engineering. O'Steen, D.A., r1980, p.41-471
MP 1383 Road construction and maintenance problems in central Alas-	Petroleum industry Design considerations for airfields in NPRA. Crory, F.B., et	MP 166
ka. Clark, E.F., et al, [1976, 36p.] SR 76-06	al, [1978, p.441-458] MEP 1086	Frust heave forces on piling. Each, D.C., et al, [1985, 2p.] MP 173:
Physical and thermal disturbance and protection of perma- frost. Brown, J., et al. [1979, 42p.] SR 79-05	Phase transformations Compressibility characteristics of compacted snow. Abele,	Real-time measurements of uplifting ice forces. Zabilanaky L.J., [1985, p.253-259] MP 209:
Workshop on Environmental Protection of Permafrost Ter-	G., et al, (1976, 47p.) CR 76-21	Uplifting forces exerted by adfrozen ice on marine piles
rain. Brown, J., et al, [1980, p.30-36] MP 1314 Snow pads for pipeline construction in Alaska, Johnson,	Low temperature phase changes in moist, briny clays. Anderson, D.M., et al, [1980, p.139-144] MP 1330	Christensen, F.T., et al., [1985, p.529-542] MP 198:
P.R., et al, [1980, 28p.] CR 80-17	Phase change around a circular pipe. Lunardini, V.J.,	Frost jacking forces on H and pipe piles embedded in Pair banks silt. Johnson, J.B., et al., ¿1985, p.125-133, NP 1930
Construction of foundations in permsfrost. Linell, K.A., et al, [1980, 310p.]	(1980, 18p.) CR 80-27 Heat transfer in cold climates. Lunardini, V.J., (1981,	
Sublimation and its control in the CRREL permafrost tunnel.	731p. ₁ MP 1435	Use of piling in frozen ground. Crory, F.E., [1980, 21 p., MP 146
Johansen, N.I., [1981, 12p.] SR 81-08	Cylindrical phase change approximation with effective thermal diffusivity. Lunardini, V.J., [1981, p.147-154]	MP 146 Real-time measurements of uplifting ice forces. Zabilanaky
Surface disturbance and protection during economic develop- ment of the North. Brown, J., et al. [1981, 88p.]	MP 1438	L.J., (1985, p.253-259) MIP 209
MP 1467 Permafreet samplers	Some approaches to modeling phase change in freezing soils. Hromadka, T.V., II, et al, [1981, p.137-145]	Pile structures Los formes on vertical sites Nevel D E et al -1972 p. 104
Subsurface explorations in permafrost areas. Cass, J.R., Jr.,	MP 1437	Ice forces on vertical piles. Nevel, D.E., et al, [1972, p.104- 114] MP 102-
[1959, p.31-41] MP 885 Drilling and coring of frozen ground in northern Aleska,	Deforming finite elements with and without phase change. Lynch, D.R., et al, (1981, p.81-96) MP 1493	Investigation of ice forces on vertical structures. Hirayams K., et al, [1974, 153p.] MIP 104
Spring 1979. Lawson, D.B., et al., [1980, 14p.]	Phase change around a circular cylinder. Lunardini, V.J.,	Ice forces on model structanes. Zabilansky, L.J., et al
	AND THE PARTY NAMED AND THE PARTY NAMED IN THE PART	-1975 n 400-407- NATO 64

The American Control of the American Matter to the American	# 1	
loe forces on simulated structures. Zabilansky, L.J., et al., [1975, p.387-396] MP 864	Subsea trenching in the Arctic. Mellor, M., (1981, p.843-882) MP 1464	Pnoumatic equipment De-icing of radomes and lock walls using pneumatic devices
Ice forces on vertical piles. Nevel, D.B., et al, [1977, 9p.]	Revegetation along pipeline rights-of-way in Alaska. John-	Ackley, S.F., et al, (1977, p.467-478) MP 106
CR 77-10	son, L., [1984, p.254-264] MP 2113	Pol_rization (waves)
ice engineering. O'Steen, D.A., [1980, p.41-47]	Simple design procedure for heat transmission system piping.	Polarization studies in sea ice. Arcone, S.A., et al, [1980,
MP 1602	Phetteplace, G.E., [1985, p.1748-1752] MP 1942	p.225-245 ₁ MP 1324
Construction of foundations in permafrost. Linell, K.A., et al, [1980, 310p.] SR 80-34	Pipes (takes)	Polarization of skylight. Bohren, C., [1984, p.261-265]
Piling in frozen ground. Crory, F.E., [1982, p.112-124]	Phase change around a circular pipe. Lunardini, V.J.,	MP 1794
MP 1722	[1980, 18p.] CR 80-27 Phase change around a circular cylinder. Lunardini, V.J.,	Pollution
Dynamic ice-structure interaction during continuous crush-	[1981, p.598-600] MP 1507	Mercury contamination of water samples. Cragin, J.H. [1979, p.313-319] MP 1270
ing. MESITEEnen, M., [1983, 48p.] CR 83-05	Approximate phase change solutions for insulated buried cyl-	Health aspects of land treatment. Reed, S.C., r1979, 43p.,
Foundations in permafrost and seasonal frost; Proceedings.	inders. Lunardini, V.J., [1983, p.25-32] MIP 1593	MP 138
[1985, 62p.] MP 1730 Frost beave forces on piling. Each, D.C., et al, [1985, 2p.]	Polyvir 1 chloride pipes and ground water chemistry. Park-	Sensitivity of vegetation and soil flora to seawater spills, Alas
MP 1732	er, L, et al, [1985, 27p.] SR 85-12	ka. Simmons, C.L., et al, [1983, 35p.] CR 83-24
Piles	Planetary environments	Polymers
Application of ice engineering and research to Great Lakes	Proceedings of the second planetary water and polar pro- cesses colloquium, 1978. 1978, 209p.; MP 1193	Ice releasing block-copolymer coatings. Jellinek, H.H.G., et al, [1978, p.544-551] MP 1141
problems. Freitag, D.R., [1972, p.131-138]	Plankton	Seeking low ice adhesion. Sayward, J.M., (1979, 83p.)
MP 1615	Chosnofiagellata from the Weddell Sea, summer 1977.	SR 79-11
Pingos On the origin of pingos—a comment. Mackay, J.R., [1976,	Buck, K.R., [1980, 26p.] CR 80-16	Adhesion of ice to polymers and other surfaces. Itagaki, K.
p.295-298 ₁ MP 916	Morphology and ecology of diatoms in sea ice from the Wed-	[1983, p.241-252] MP 1580
Pipe flow	dell See. Clarke, D.B., et al, [1984, 41p.] CR 84-05	Wetting tests of polystyrene and urethane roof insulations
Ice bands in turbulent pipe flow. Ashton, G.D., [1984,	Plant ecology	Tobiasson, W., et al. [1984, 9p. + figs.] MP 2011
7p.) MIP 2007	Climatic and dendroclimatic indices in the discontinuous per- mafrost zone of the Central Alaskan Uplands. Haugen,	Turbulent heat flux from Austin heats. And are W. E. et al.
Pipe laying	R.K., et al, [1978, p.392-398] MIP 1099	Turbulent heat flux from Arctic leads. Andreas, E.L., et al [1979, p.57-91] MP 1346
Subses trenching in the Arctic. Mellor, M., [1981, 31p.] CR \$1-17	Plant physiology	Physical oceanography of the seasonal sea ice zone
Pipeline freezing	Sessonal variations in plant nutrition in tundra soils.	McPhee, M.G., [1980, p.93-132] MP 1294
Freeze damage prevention in utility distribution lines.	McCown, B.H., et al, [1971, p.55-57] MP 904	Estimation of heat and mass fluxes over Arctic leads. An-
McFadden, T., [1977, p.221-231] MP 929	Effects of inundation on six varieties of turfgrass. Erbisch,	dress, E.L., [1980, p.2057-2063] MP 1416
Freeze damage protection for utility lines. McFadden, T.,	F.H., et al, [1982, 25p.] SR 82-12	Condensate profiles over Arctic leads. Andreas, E.L., et al.
(1977, p.12-16) MIP 953	U.S. tundra biome publication list. Brown, J., et al, [1983, 29p.] SR 83-29	[1981, p.437-460] MCP 1479
Cold climate utilities delivery design manuar. Smith, D.W.,	Growth and flowering of tussocks in northcentral Alasks.	Sea ice state during the Weddell Sea Expedition. Ackley S.F., et al, [1983, 6p. + 59p.] SR 83-2
et al. (1979, c300 leaves) MP 1373	Haugen, R.K., et al. [1984, p.10-11] MP 1950	Ponds
Freezing and blocking of water pipes. Carey, K.L., 1982, 11p. ₁ TD 82-01	Effect and disposition of TNT in a terrestrial plant. Palazzo.	Suppression of ice fog from cooling ponds. McFadden, T.
Preexing in a pipe with turbulent flow. Albert, M.R., et al,	A.J., et al, [1986, p.49-52] MIP 2098	[1976, 78p.] CR 76-43
[1983, p.102-112] MIP 1893	Plant tieres	Wastewater stabilization pond linings. Middlebrooks, E.J.
Ice-blocked drainage: problems and processes. Carey, K.L.,	Aquatic plant growth in relation to temperature and unfrozen	et al, [1978, 116p.] SR 78-26
[1983, 9p.] TD 83-02	water content. Palazzo, A.J., et al, [1984, 8p.]	Energy requirements for small flow wastewater treatment sys-
Ice bands in turbulent pipe flow. Ashton, G.D., 1984, 7p., MP 2067	Plants (botany)	tems. Middlebrooks, E.J., et al, [1979, 82p.]
7p. ₁ MP 2007 Solving problems of ice-blocked drainage. Carey, K.L.,	Revegetation in arctic and subarctic North America—a litera-	International and national developments in land treatment of
[1984, 9p.] TD 84-02	ture review. Johnson, L.A., et al, [1976, 32p.]	wastewater. McKim, H.L., et al, [1979, 28p.]
Introduction to heat tracing. Henry, K., [1986, 20p.]	CR 76-15	MP 1420
TD 86-01	Urban waste as a source of heavy metals in land treatment.	Cost-effective use of municipal wastewater treatment ponds
Pipeline insulation	Iskandar, I.K., [1976, p.417-432] MP 977	Reed, S.C., et al, [1979, p.177-200] MIP 1413
Freeze damage protection for utility lines. McFadden, T.,	Effects of wastewater application on forage grasses. Palazzo, A.J., [1976, 8p.] CR 76-39	Aquaculture systems for wastewater treatment. Reed, S.C. et al, [1980, p.1-12] MP 1423
[1977, p.12-16] MP 953 Specialized pipeline equipment. Hanamoto, B., [1978,	Reclamation of scidic dredge soils with sewage sludge and	
30p. ₁ SR 78-05	lime. Palazzo, A.J., [1977, 24p.] SR 77-19	Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al, [1980, 127p.] MP 1422
Phase change around insulated buried pipes: quasi-steady	Effects of wastewater on the growth and chemical composi-	MP 1422
method. Lunardini, V.J., [1981, p.201-207]	tion of forages. Palazzo, A.J., [1977, p.171-180]	Ice growth on Post Pond, 1973-1982. Gow, A.J., et al.
MP 1496	MP 975	(1983, 25p.) CR 83-04
Pipeline supports	Ecology on the Yukon-Prudhoe haul road. Brown, J., ed, [1978, 131p.] MP 1115	Nitrogen removal in wastewater stabilization ponds. Reed. S.C., (1983, 13p. + figs.) MP 1943
Movement study of the trans-Alaska pipeline at selected sites. Ueda, H.T., et al, [1981, 32p.] CR 81-84	Effects of a tundra fire on soil and vegetation. Racine, C.,	Nitrogen removal in wastewater ponds. Reed, S.C., [1984,
Performance of a thermosyphon with an inclined evaporator	[1980, 21p.] SR 89-37	26p. ₁ CR 84-13
and vertical condenser. Zarling, J.P., et al, [1984, p.64-	Aquaculture for wastewater treatment in cold climates.	Porosity
68 ₁ MP 1677	Reed, S.C., et al, [1981, p.482-492] MP 1394	Difficulties of measuring the water saturation and porosity of
Prost jacking forces on H and pipe piles embedded in Pair- banks silt. Johnson, J.B., et al, [1985, p.125-133]	Wastewater treatment and plant growth. Palazzo, A.J.,	snow. Colbeck, S.C., [1978, p.189-201] MIP 1124
MP 1930	[1982, 21p.] SR 82-05	Configuration of ice in frozen media. Colbeck, S.C., [1982,
Pipelines	Vegetation and environmental aradients of the Prudhoe Bay region, Alaska. Walker, D.A., (1985, 239p.)	p.116-123 ₁ MP 1512 Geometry and permittivity of an are at high frequencies Col
Workshop on permafrost-related research and TAPS, 11975,	CIR 85-14	Geometry and permittivity of snow at high frequencies. Col- beck, S.C., (1982, p.4495-4500) MP 1545
37p. ₁ MP 1122	Plastic deformation	Influence of grain size on the ductility of ice. Cole, D.M.
Utility distribution practices in northern Europe. McFadden, T., et al, [1977, p.70-95] MCFadMP 928	In-plane deformation of non-coaxial plastic soil. Takagi, S.,	[1984, p.150-157] MIP 1686
Haines-Fairbanks pipeline: design, construction and opera-	[1978, 28p.] CR 78-07	Variation of ice strength within and between multiyear pres-
tion. Garfield, D.E., et al, [1977, 20p.] SR 77-84	Plastic flow Modeling pack ice as a viscous-plastic continuum. Hibler,	sure ridges in the Beaufort Sea. Weeks, W.F., [1984, p.134-139] MP 1680
Revegetation and erosion control of the Trans-Alaska Pipe-		
line. Johnson, L.A., et al, 1977, 36p.; SR 77-08	W.D., III. (1977, p.46-55) MP 1164	Persona meteoriale
Canol Pipeline Project: a historical review. Ueda, H.T., et al,	W.D., III, [1977, p.46-55] MP 1164	Persona metaglala
.1977 32n	W.D., III, [1977, p.46-55] MP 1164 Role of plastic ice interaction in marginal ice zone dynamica. Lepparanta, M., et al, [1985, p.11,899-11,909]	Persona metaglala
(1977, 32p.) SR 77-34 Large mobile drilling rise used along the Alaska pineline.	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Lepparanta, M., et al, [1985, p.11,899-11,909] MIP 1544	Perous materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p.] CR 76-06 Moving boundary problems in the hydrodynamics of porous
[1977, 32p.] SR 77-34 Large mobile drilling rigs used along the Alsaka pipeline. Sellmann, P.V., et al., [1978, 23p.] SR 78-84	W.D., III, [1977, p.46-55] MP 1164 Role of plastic ice interaction in marginal ice zone dynamics. Leppäranta, M., et al, [1985, p.11,899-11,909] MP 1544 Plastic properties	Porous materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p.] CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MP 1343
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al. [1978, 23p.] Specialized pipeline equipment. Hanamoto, B., [1978,	W.D., III, t1977, p.46-55, MP 1164 Role of plastic loe interaction in marginal ice zone dynamics. Lepparanta, M., et al. t1985, p.11,899-11,909, MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil.	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Byaluation of the moving boundary theory. Nakano, Y.
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., (1978, 23p., SR 78-64 Specialized pipeline equipment. Hanamoto, B., (1978, 30p., SR 78-65	W.D., III, t1977, p.46-55, Role of plastic ice interaction in marginal ice zone dynamics. Lepptranta, M., et al, t1985, p.11,899-11,909, MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., t1979, p.1049-1072, MP 1248	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p.] CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Evaluation of the moving boundary theory. [1978, p.142-151] Nakano, Y. MP 1343
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] SR 78-64 Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] SR 78-65 Construction equipment problems and procedures. Alaska	W.D., III, t1977, p.46-55, MP 1164 Role of plastic loe interaction in marginal ice zone dynamics. Lepparanta, M., et al. t1985, p.11,899-11,909, MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil.	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Byaluation of the moving boundary theory. Nakano, Y.
Large mobile drilling rigs used along the Alaska pipeline. SR 78-04 Specialized pipeline equipment. Hanamoto, B., 1978, 30p.; 30p.; SR 78-05 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.]	W.D., III, t1977, p.46-55; MP 1164 Role of plastic ice interaction in marginal ice zone dynamics. Lepptranta, M., et al. t1985, p.11,899-11,909; MP 1544 Plastic preparties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., t1979, p.1049-1072; MP 1248 Analysis of non-steady plastic shock waves in snow. Brown,	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p.] CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MP 1343 Ralaution of the moving boundary theory. Nakano, Y., [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y.
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] SR 78-64 Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-11 Undersea pipelines and cables in polar waters. Mellor, M.,	W.D., III, t1977, p.46-55, Role of plastic ice interaction in marginal ice zone dynamics. Leppiranta, M., et al., t1985, p.11,899-11,909, MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] Analysis of non-steady plastic shock waves in snow. Brown, R.L., t1980, p.279-287, MP 1354 Plasticity tests Report of the ITTC panel on testing in ice, 1978. Franken-	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p.] CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Evaluation of the moving boundary theory. [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y. [1980, p.81-85]
Large mobile drilling rigs used along the Alaska pipeline. SR 78-94 Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Undersea pipelines and cables in polar waters. (1978, 34p.) CR 78-22	W.D., III, t1977, p.46-55, MP 1164 Role of plastic ice interaction in marginal ice zone dynamics. Leppăranta, M., et al., t1985, p.11,899-11,909, MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., t1979, p.1049-1072, MP 1248 Analysis of non-steady plastic shock waves in snow. Brown. R.L., t1980, p.279-287, MP 1334 Plasticity tasts Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al, t1978, p.157-179, MP 1148	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Evaluation of the moving boundary theory. Nakano, Y. [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y. [1980, p.81-85] Water and air vertical flow through porous media. Nakano, Y. [1980, p.81-85]
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., (1978, 23p.) SR 78-94. Specialized pipeline equipment. Hanamoto, B., (1978, 30p.) SR 78-95. Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., (1978, 14p.) SR 78-11. Undersee pipelines and cables in polar waters. Mellor, M., (1978, 34p.) CR 78-22. Application of heat pipes on the Trans-Alaska Pipeline.	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppäranta, M., et al., [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] Analysis of non-steady plastic shock waves in anow. Brown, R.L., [1980, p.279-287] Plasticity tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179] MP 1149 Plastics	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MP 1343 Savaluation of the moving boundary theory. Nakano, Y., [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. [1980, p.81-85] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Nakano, Y., [1980, p.124-133]
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-85 Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-11 Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.) Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.B., (1979, 27p.) SR 79-26	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppăranta, M., et al., [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] Analysis of non-steady plastic shock waves in snow. R.L., [1980, p.279-287] MP 1354 Plasticity tests Report of the ITITC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179] MP 1149 Plastics Utility distribution practices in northern Europe. McFad-	Percess materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MF 1343 Bvaluation of the moving boundary theory. Nakano, Y., [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y., [1980, p.18-5] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Structural evaluation of porous pavement in cold climate
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., (1978, 23p., SR 78-64). Specialized pipeline equipment. Hanamoto, B., (1978, 30p.) SR 78-65. Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., (1978, 14p.) SR 78-11. Undersea pipelines and cables in polar waters. (1978, 34p.) CR 78-22. Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.E., (1979, 27p.) Snow pads for pipeline construction in Alaska. Johnson,	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppäranta, M., et al., [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] Analysis of non-steady plastic shock waves in anow. Brown, R.L., [1980, p.279-287] Plasticity tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179] MP 1149 Plastics	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Bvaluation of the moving boundary theory. Nakano, Y. (1978, p.142-151) Functional analysis of the problem of wetting fronts. Nakano, Y., (1980, p.314-318) Water and air horizontal flow in porous media. Nakano, Y. (1980, p.81-85) Water and air vertical flow through porous media. Nakano, Y., (1980, p.124-133) Structural evaluation of porous pavement in cold climate Eaton, R.A., et al., (1980, 43p.) SR 80-35
Large mobile drilling rigs used along the Alaska pipeline. SR 78-04. Specialized pipeline equipment. Hanamoto, B., [1978, 23p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.] Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.] Application of heat pipes on the Trans-Alaska Pipeline, C.E., (1979, 27p.) Snow pads for pipeline construction in Alaska. P.R., et al., (1980, 28p.) Revegetation along roads and pipelines in Alaska. Johnson, Revegetation along roads and pipelines in Alaska.	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppäranta, M., et al., [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] Analysis of non-steady plastic shock waves in anow. Brown, R.L., [1980, p.279-287] Plasticity tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179] MP 1149 Plastics Utility distribution practices in northern Europe. McFadden, T., et al., [1977, p.70-95] Plaste	Percess materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Bvaluation of the moving boundary theory. Nakano, Y. [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y., [1980, p.134-313] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Structural evaluation of porous pavement in cold climate Eaton, R.A., et al, [1980, 43p.] Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media.
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p., SR 78-94]. Specialized pipeline equipment. Hanamoto, B., [1978, 30p., SR 78-95]. Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p., SR 78-95]. Undersea pipelines and cables in polar waters. GR 78-22. Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.E., [1979, 27p., SR 79-26]. Snow pads for pipeline construction in Alaska. Johnson, P.R., et al., [1980, 28p., SR 78-11]. Revegetation along roads and pipelines in Alaska. Johnson, L.A., [1980, p.129-150]. MP 1353	W.D., III, 41977, p.46-55, MP 1164 Role of plastic loe interaction in marginal ice zone dynamics. Leppiranta, M., et al., 11985, p.11,899-11,909, MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., (1979, p.1049-1072, MP 1248 Analysis of non-steady plastic shock waves in snow. Brown, R.L., (1980, p.279-287) MP 1354 Plasticity tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., (1978, p.157-179) MP 1149 Plastics Utility distribution practices in northern Europe. McPadden, T., et al., (1977, p.70-95) McPadden, T., et al., (1977, p.70-95) CR 78-05 Viscoelasticity of floating ice plates subjected to a circular load. Takagi, S., (1978, 32p.) CR 78-05	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MP 1343 Svaluation of the moving boundary theory. Nakano, Y. [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y. [1980, p.81-85] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Structural evaluation of porous pavement in cold climate Eaton, R.A., et al., [1980, 43p.] Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media. Nakano, Y., [1981, p.57-64] MP 1415
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.) Application of heat pipes on the Trans-Alaska Pipeline. Houser, C.E., (1979, 27p.) Snow pads for pipeline construction in Alaska. Johnson, P.R., et al., (1980, 28p.) Revegetation along roads and pipelines in Alaska. Johnson, MP 1353 Ravironment of the Alaskan Haul Road. Brown, J., (1980, p. 129-150)	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppiranta, M., et al., [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] MP 1248 Analysis of non-steady plastic shock waves in snow. Brown, R.L., [1980, p.279-287] MP 1354 Plasticity tests Report of the ITITC panel on testing in ice, 1978. MP 1348 Report of the ITITC panel on testing in ice, 1978. MP 1149 Plastics Utility distribution practices in northern Europe. McPadden, T., et al., [1977, p.70-95] Plastes Viscoelasticity of floating ice plates subjected to a circular load. Takagi, S., [1978, 32p.] Investigation of the acoustic emission and deformation re-	Percoss materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MP 1343 Evaluation of the moving boundary theory. Nakano, Y., [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y., [1980, p.124-133] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Structural evaluation of porous pavement in cold climate Eaton, R.A., et al., [1980, 43p.] Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media Nakano, Y., [1981, p.57-64] Horizontal infiltration of water in porous materials. Nakano
Large mobile drilling rigs used along the Alaska pipeline. SR 78-04. Specialized pipeline equipment. Hanamoto, B., [1978, 23p., 30p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.) SR 78-22 Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.B., [1979, 27p.) Snow pads for pipeline construction in Alaska. P.R., et al., [1980, 28p.] Revegetation along roads and pipelines in Alaska. MP 1353 Bavironment of the Alaskan Haul Road. Brown, J., [1980, p.3-25] MP 1353	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppăranta, M., et al. [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] MP 1248 Analysis of non-steady plastic abock waves in snow. Brown, R.L., [1980, p.279-287] MP 1354 Plasticity tests Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179] MP 1149 Plastics Utility distribution practices in northern Europe. McFadden, T., et al., [1977, p.70-95] McFadden, T., et al., [1977, p.70-95] Plastes Viscoelasticity of floating ice plates subjected to a circular load. Takagi, S., [1978, 32p.] Investigation of the acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981],	Perces materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Bvaluation of the moving boundary theory. Nakano, Y. [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y., [1980, p.124-133] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-134] STRUCTURAL evaluation of porous pavement in cold climate Eaton, R.A., et al, [1980, 43p.] Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media Nakano, Y., [1981, p.57-64] Horizontal infiltration of water in porous materials. Nakano Y., [1982, p.156-166]
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.) Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.E., [1979, 27p.) Snow pads for pipeline construction in Alaska. Johnson, P.R., et al., [1980, 28p.] Revegetation along roads and pipelines in Alaska. Johnson, L.A., (1980, p.129-150) Bavironment of the Alaskan Haul Road. Brown, J., [1980, p.3-52] Bavironmental engineering, Yukon River-Prudhoe Bay Haul	W.D., III, [1977, p.46-55] Role of plastic loe interaction in marginal ice zone dynamics. Leppiranta, M., et al., [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] Analysis of non-steady plastic shock waves in snow. Brown. R.L., [1980, p.279-287] MP 1248 Report of the ITTC panel on testing in ice, 1978. Prankenstein, G.E., et al., [1978, p.157-179] MP 1349 Plastics Utility distribution practices in northern Europe. McPadden, T., et al., [1977, p.70-95] MP 928 Viscoelasticity of floating ice plates subjected to a circular load. Takagi, S., [1978, 32p.] CR 78-05 Investigation of the acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981, 19p.] CR 81-06	Percoss materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MP 1343 Evaluation of the moving boundary theory. Nakano, Y., [1978, p.142-151] Functional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y., [1980, p.124-133] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Structural evaluation of porous pavement in cold climate Eaton, R.A., et al., [1980, 43p.] Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media Nakano, Y., [1981, p.57-64] Horizontal infiltration of water in porous materials. Nakano
Large mobile drilling rigs used along the Alaska pipeline. SR 78-04. Sellmann, P.V., et al., [1978, 23p., 30p.] Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-05. SR 78-05. SR 78-05. SR 78-05. SR 78-05. SR 78-11. Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.) CR 78-22. Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.B., (1979, 27p.) SR 79-26. Snow pads for pipeline construction in Alaska. P.R., et al., (1980, 28p.) Revegetation along roads and pipelines in Alaska. Johnson, L.A., (1980, p.129-150) Bavironment of the Alaskan Haul Road. Brown, J., (1980, p.3-52) Bavironmental engineering, Yukon River-Prudhoe Bay Haul Road. Brown, J., ed., (1980, 187p.) Movement study of the trans-Alaska pipeline at selected sites.	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppăranta, M., et al., [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] MP 1248 Analysis of non-steady plastic shock waves in snow. Brown. R.L., [1980, p.279-287] MP 1334 Plasticity tasts Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179] MP 1449 Plastics Utility distribution practices in northern Europe. McPadden, T., et al., [1977, p.70-95] McPadden, T., et al., [1977, p.70-95] Investigation of the acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981, p.123-133] Acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981, p.123-133]	Percess materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Bvaluation of the moving boundary theory. Nakano, Y. (1978, p.142-151) Functional analysis of the problem of wetting fronts. Nakano, Y., (1980, p.314-318) Water and air horizontal flow in porous media. Nakano, Y., [1980, p.124-133] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Structural evaluation of porous pavement in cold climate Eaton, R.A., et al, (1984, 43p.) Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media Nakano, Y., [1981, p.57-64] MP 1419 Horizontal inflitration of water in porous materials. Nakano Y., [1982, p.156-166] Wetting fronts in porous media. Nakano, Y., [1983, p.71-78] Calculation of advective mass transport in beterogeneous
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.) Application of heat pipes on the Trans-Alaska Pipeline. Houser, C.E., (1979, 27p.) Sanow pada for pipeline construction in Alaska. Johnson, P.R., et al., (1980, 28p.) Revegetation along roads and pipelines in Alaska. Johnson, MP 1353 Bavironment of the Alaskan Haul Road. Brown, J., (1980, p.3-52) Bavironmental engineering, Yukon River-Prudhoe Bay Haul Road. Brown, J., ed., (1980, 187p.) Movement study of the trans-Alaska pipeline at selected sites. Ueda, H.T., et al., (1981, 21981, 32p.) CR 80-19	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppiranta, M., et al., [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] MP 1248 Analysis of non-steady plastic shock waves in snow. Brown, R.L., [1980, p.279-287] MP 1354 Plasticity tests Report of the TITC panel on testing in ice, 1978. MP 1348 Report of the TITC panel on testing in ice, 1978. MP 1149 Plastics Utility distribution practices in northern Europe. McPadden, T., et al., [1977, p.70-95] MP 222 Plastes Viscoelasticity of floating ice plates subjected to a circular load. Takagi, S., [1978, 32p.] Investigation of the acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981, p.123-133] MP 1436	Percess materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MP 1343 Svaluation of the moving boundary theory. Nakano, Y., [1978, p.142-151] Functional analysis of the problem of wetting froms. Nakano, Y., [1980, p.314-318] Water and air horizontal flow in porous media. Nakano, Y., [1980, p.124-133] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Structural evaluation of porous pavement in cold climate Eaton, R.A., et al., (1980, 43p.) Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media. Nakano, Y., [1981, p.57-64] Horizontal infiltration of water in porous materials. Nakano Y., [1982, p.156-166] Wetting fronts in porous media. Nakano, Y., [1983, p.71-78] Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-89) MP 1697
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] Sillmann, P.V., et al., [1978, 23p.] Sillmann, P.V., et al., [1978, 23p.] Sillmann, P.V., et al., [1978, 23p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Sillmann, P.R., 14p.] Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.) Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.B., (1979, 27p.) Sillmann, P.R., et al., (1980, 28p.) Revegetation along roads and pipelines in Alaska. Johnson, L.A., (1980, p.129-150) May incoment of the Alaskan Haul Road. Brown, J., (1980, p.3-52) Rayfrommental engineering, Yukon River-Prudhoe Bay Haul Road. Brown, J., ed., (1980, 187p.) Movement study of the trans-Alaska pipeline at selected sites. Ueda, H.T., et al., [1981, 32p.] Losses from the Fort Wainwright heat distribution system.	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppăranta, M., et al. [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] MP 1248 Analysis of non-steady plastic shock waves in snow. Brown, R.L., [1980, p.279-287] MP 1354 Plasticity tests Report of the ITITC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179] MP 1149 Plastics Utility distribution practices in northern Europe. McFadden, T., et al., [1977, p.70-95] Mr 1929 Plastes Viscoelasticity of floating ice plates subjected to a circular load. Takagi, S., [1978, 32p.] Investigation of the acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981, 19p.] Acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981, p.123-133) MP 1436 On the buckling force of floating ice plates. Kerr, A.D.,	Percess materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MF 1343 Bvaluation of the moving boundary theory. Nakano, Y., [1978, p.142-151] MF 1147 Punctional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] MF 1307 Water and air horizontal flow in porous media. Nakano, Y., [1980, p.124-133] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-134] Structural evaluation of porous pavement in cold climate Eaton, R.A., et al., [1984, 43p.; SR 80-35] Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media Nakano, Y., [1981, p.57-64] Horizontal infiltration of water in porous materials. Nakano Y., [1982, p.156-166] Wetting fronts in porous media. Nakano, Y., [1983, p.71-78] Calculation of advective mass transport in heterogeneous media. Daly, C.J., [1983, p.73-89] MP 1679 Colculation of advective mass transport in heterogeneous media. Daly, C.J., [1983, p.73-89] MP 1680
Large mobile drilling rigs used along the Alaska pipeline. SR 78-04. Sellmann, P.V., et al., [1978, 23p., 30p.] Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] SR 78-05. SR 78-05. SR 78-05. SR 78-05. SR 78-11. Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.) Application of heat pipes on the Trans-Alaska Pipeline. CR 78-22. Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.B., (1979, 27p.) SR 79-26. Snow pads for pipeline construction in Alaska. P.R., et al., (1980, 28p.) Revegetation along roads and pipelines in Alaska. Johnson, CR 80-17. Revegetation along roads and pipelines in Alaska. Johnson, L.A., (1980, p.129-150) Revironment of the Alaskan Haul Road. Brown, J., (1980, p.3-52) Bavironment of the Alaskan Haul Road. Brown, J., (1980, 187p.) Road. Brown, J., ed., (1980, 187p.) CR 86-19 Movement study of the trans-Alaska pipeline at selected sites. Ueda, H.T., et al., (1981, 32p.) CR 81-04 Losses from the Fort Wainwright heat distribution system. Phetteplace, C., et al., (1981, 25p.) SR 81-14	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppăranta, M., et al. [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] MP 1248 Analysis of non-steady plastic shock waves in snow. Brown. R.L., [1980, p.279-287] MP 1334 Plasticity tasta Report of the ITTC panel on testing in ice, 1978. Frankenstein, G.B., et al, [1978, p.157-179] MP 1449 Plastics Utility distribution practices in northern Europe. McFadden, T., et al, [1977, p.70-95] McFadden, T., et al, [1977, p.70-95] Investigation of the acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al, [1981, 199-] Acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al, [1981, p.123-133] MP 1436 On the buckling force of floating ice plates. Kerr, A.D., (1981, 7p.) CR 81-09	Percess materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] Bvaluation of the moving boundary theory. Nakano, Y. (1978, p.142-151) Functional analysis of the problem of wetting fronts. Nakano, Y., (1980, p.314-318) Water and air horizontal flow in porous media. Nakano, Y., [1980, p.124-133] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-133] Structural evaluation of porous pavement in cold climate Eaton, R.A., et al, (1984, 43p.) Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media Nakano, Y., [1981, p.57-64] MP 1419 Horizontal inflitration of water in porous materials. Nakano Y., [1982, p.156-166] Wetting fronts in porous media. Nakano, Y., [1983, p.71-78] Calculation of advective mass transport in heterogeneous media. Daly, C.J., (1983, p.73-89) Boundary value problem of flow in porous media. Nakano Y., (1983, p.205-213)
Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] Sillmann, P.V., et al., [1978, 23p.] Sillmann, P.V., et al., [1978, 23p.] Sillmann, P.V., et al., [1978, 23p.] Construction equipment problems and procedures: Alaska pipeline project. Hanamoto, B., [1978, 14p.] Sillmann, P.R., 14p.] Undersea pipelines and cables in polar waters. Mellor, M., (1978, 34p.) Application of heat pipes on the Trans-Alaska Pipeline. Heuer, C.B., (1979, 27p.) Sillmann, P.R., et al., (1980, 28p.) Revegetation along roads and pipelines in Alaska. Johnson, L.A., (1980, p.129-150) May incoment of the Alaskan Haul Road. Brown, J., (1980, p.3-52) Rayfrommental engineering, Yukon River-Prudhoe Bay Haul Road. Brown, J., ed., (1980, 187p.) Movement study of the trans-Alaska pipeline at selected sites. Ueda, H.T., et al., [1981, 32p.] Losses from the Fort Wainwright heat distribution system.	W.D., III, [1977, p.46-55] Role of plastic ice interaction in marginal ice zone dynamics. Leppăranta, M., et al. [1985, p.11,899-11,909] MP 1544 Plastic properties Steady in-plane deformation of noncoaxial plastic soil. Takagi, S., [1979, p.1049-1072] MP 1248 Analysis of non-steady plastic shock waves in snow. Brown, R.L., [1980, p.279-287] MP 1354 Plasticity tests Report of the ITITC panel on testing in ice, 1978. Frankenstein, G.E., et al., [1978, p.157-179] MP 1149 Plastics Utility distribution practices in northern Europe. McFadden, T., et al., [1977, p.70-95] Mr 1929 Plastes Viscoelasticity of floating ice plates subjected to a circular load. Takagi, S., [1978, 32p.] Investigation of the acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981, 19p.] Acoustic emission and deformation response of finite ice plates. Xirouchakis, P.C., et al., [1981, p.123-133) MP 1436 On the buckling force of floating ice plates. Kerr, A.D.,	Percess materials Water flow through veins in ice. Colbeck, S.C., [1976, 5p., CR 76-06 Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MF 1343 Bvaluation of the moving boundary theory. Nakano, Y., [1978, p.142-151] MF 1147 Punctional analysis of the problem of wetting fronts. Nakano, Y., [1980, p.314-318] MF 1307 Water and air horizontal flow in porous media. Nakano, Y., [1980, p.124-133] Water and air vertical flow through porous media. Nakano, Y., [1980, p.124-134] Structural evaluation of porous pavement in cold climate Eaton, R.A., et al., [1984, 43p.; SR 80-35] Traveling wave solution to the problem of simultaneous flow of water and air through homogeneous porous media Nakano, Y., [1981, p.57-64] Horizontal infiltration of water in porous materials. Nakano Y., [1982, p.156-166] Wetting fronts in porous media. Nakano, Y., [1983, p.71-78] Calculation of advective mass transport in heterogeneous media. Daly, C.J., [1983, p.73-89] MP 1679 Colculation of advective mass transport in heterogeneous media. Daly, C.J., [1983, p.73-89] MP 1680

Perous materials (cont.)	Sea icc rubble formations off the NE Bering Sea and Norton	Nose shape and L/D ration, and projectile penetration i
Computation of porous media natural convection flow and phase change. O'Neill, K., et al, [1984, p.213-229]	Sound. Kovacs, A., [1981, p.1348-1363] MP 1527 Sea ice piling at Fairway Rock, Bering Strait, Alaska.	frozen soil. Richmond, P.W., (1980, 21p.) SE 80-1 Impact fuse performance in snow (Initial evaluation of a net
MIP 1895	Kovacs, A., et al, [1981, p.985-1000] MIP 1460	test technique). Aitken, G.W., et al, [1980, p.31-45] MP 134
Diffusivity of horizontal water flow through porous media. Nakano, Y., [1985, p.26-31] MP 1881	Dynamics of near-shore ice. Kovacs, A., et al, [1981, p.125-135] MP 1599	Small caliber projectile penetration in frozen soil. Rich
Experimental measurement of channeling of flow in porous media. Oliphant, J.L., et al, [1985, p.394-399]	Morphology of sea ice pressure ridge sails. Tucker, W.B., et al, (1981, p.1-12) MP 1465	mond, P.W., [1980, p.801-823] MP 149
MP 1967	Multi-year pressure ridges in the Canadian Beaufort Sea.	Deceleration of projectiles in snow. Albert, D.G., et a (1982, 29p.) CE 82-3
Portable shelters Operation of the CRREL prototype air transportable shelter.	Wright, B., et al, [198], p.125-145] MP 1514 Ice pile-up and ride-up on arctic and subarctic beaches.	Ice penetration tests. Garcia, N.B., et al, [1985, p.223- 236] MP 281
Planders, S.N., (1980, 73p.) SR 30-10	Kovacs, A., et al, [1981, p.247-273] MIP 1538	Propellers
Cold regions testing of an air-transportable shelter. Flanders, S.N., 1981, 20p., CR 81-16	Sea ice rubble formations in the Bering Sea and Norton Sound, Alaska. Kovaca, A., (1981, 23p.) SR 81-34	Evaluation of ice deflectors on the USCG icebreaker Pols Star. Vance, G.P., [1980, 37p.] SR 88-8
Air-transportable Arctic wooden shelters. Flanders, S.N., et	Modeling pressure ridge buildup on the geophysical scale.	Star. Vance, G.P., [1980, 37p.] SR 88-8-8 Self-shedding of accreted ice from high-speed rotors. Itagr
al, (1982, p.385-397) MP 1558 Perts	Hibler, W.D., III, [1982, p.141-155] MP 1590 Bering Strait sea ice and the Pairway Rock icefoot. Kovacs,	ki, K., [1983, p.1-6] MIP 171
Bibliography on harbor and channel design in cold regions.	A., et al, [1982, 40p.] CR 82-31	Mechanical ice release from high-speed rotors. Itagaki, K (1983, 8p.) CR 83-2
Haynes, F.D., [1976, 32p.] CR 76-03 Methods of ice control for winter navigation in inland waters.	Properties of ses ice in the coastal zones of the polar oceans. Weeks, W.F., et al, [1983, p.25-41] MP 1684	Protection
Frankenstein, G.E., et al. [1984, p.329-337] MP 1831	Characteristics of multi-year pressure ridges. Kovacs, A.,	Ecological and environmental consequences of off-road training in northern regions. Brown, J., [1976, p.40-53]
Position (location) See ice drift and deformation from LANDSAT imagery. Hi-	[1983, p.173-182] MP 1698 Summary of the strength and modulus of ice samples from	MP 138
bler, W.D., III, et al. [1976, p.115-135] MP 1659	multi-year pressure ridges. Cox, G.F.N., et al, 1984,	Hydraulic model study of a water intake under frazil ice conditions. Tantillo, T.J., [1981, 11p.] CR 81-8
Power line icing Utility distribution practices in northern Europe. McFad-	p.126-133 ₁ MP 1679 Variation of ice strength within and between multiyear pres-	Protective contings
den, T., et al, [1977, p.70-95] MIP 928	sure ridges in the Beaufort Sea. Weeks, W.F., 1984, p.134-139, MP 1680	Thermoinsulating media within embankments on perenniall frozen soil. Berg, R.L., [1976, 161p.] SR 76-6
Field measurements of combined icing and wind loads on wires. Govoni, J.W., et al, [1983, p.205-215]	Preliminary examination of the effect of structure on the com-	Evaluation of MESL membrane—puncture, stiffness, temper
MP 1637	pressive strength of ice samples from multi-year pressure ridges. Richter, J.A., et al, [1984, p.140-144]	ature, solvents. Sayward, J.M., [1976, 60p.]
Mechanisms for ice bonding in wet snow accretions on power lines. Colbeck, S.C., et al, [1983, p.25-30] MP 1633	MP 1685	Water absorption of insulation in protected membrane roofin systems. Schaefer, D., [1976, 15p.] CR 76-3
Combined icing and wind loads on a simulated power line test	Mechanical properties of multi-year sea ice. Phase 1: Test results. Cox, G.F.N., et al, r1984, 105p.; CR 84-89	Suppression of ice fog from cooling ponds. McFadden, T
span. Govoni, J.W., et al, [1984, 7p.] MP 2114 Transfer of meteorological data from mountain-top sites.	Structure of first-year pressure ridge sails in the Prudhoe Bay	[1976, 78p.] CR 76-4
Govoni, J.W., et al, (1986, 6p.) MP 2107	region. Tucker, W.B., et al, [1984, p.115-135] MP 1837	Ice removal from the walls of navigation locks. Franker stein, G.E., et al, [1976, p.1487-1496] MP \$8
Precipitation gages Meteorological measurements at Camp Ethan Allen Training	Some probabilistic aspects of ice gouging on the Alaskan Shelf	Lock wall deicing. Hanamoto, B., {1977, p.7-14 ₁ MP 97.
Center, Vermont. Bates, R., [1982, p.77-112]	of the Beaufort Sca. Weeks, W.F., et al, [1984, p.213-236] MP 1838	Repetitive loading tests on membrane enveloped road sec
MP 1984 Precipitation (motoorology)	Method of detecting voids in rubbled ice. Tucker, W.B., et	tions during freeze thaw. Smith, N., et al, (1977, p.171-
Changes in the composition of atmospheric precipitation.	al, [1984, p.183-188] MP 1772 Tensile strength of multi-year pressure ridge sea ice samples.	197 ₁ MP 96. Ice releasing block-copolymer coatings. Jellinek, H.H.G., e
Cragin, J.H., et al. (1977, p.617-631; MP 1079 Summer air temperature and precipitation in northern Alaska.	Cox, G.F.N., et al, [1985, p.186-193] MP 1856	al, [1978, p.544-551] MCP 114
Haugen, R.K., et al, [1980, p.403-412] MIP 1439	Structure, salinity and density of multi-year sea ice pressure ridges. Richter-Menge, J.A., et al., [1985, p.194-198]	Freeze thaw loading tests on membrane enveloped road sections. Smith, N., et al, [1978, p.1277-1288]
Climate of remote areas in north-central Alaska: 1975-1979 summary. Haugen, R.K., [1982, 110p.] CR 82-35	MP 1857 Compressive strength of pressure ridge ice samples. Richter-	MP 115
Building materials and acid precipitation. Merry, C.J., et al,	Menge, J.A., et al, [1985, p.465-475] MP 1877	Performance of the USCGC Katmai Bay icebreaker. Vance G.P., [1980, 28p.] CR 80-0
[1985, 40p.] SR 85-01 Structure data bases for predicting building material distribu-	Strength and modulus of ice from pressure ridges. Cox, G.F.N., et al, [1985, p.93-98] MP 1848	Deicing a satellite communication antenna. Hanamoto, B. et al, [1980, 14p.]
tion. Merry, C.J., et al, [1985, 35p.] SR 85-07	Structure and the compressive strength of ice from pressure	Ice adhesion tests on coatings subjected to rain erosion
Prozen precipitation and concurrently observed meteorologi- cal conditions. Bilello, M.A., [1985, 11p.] MP 2075	ridges. Richter, J.A., et al, [1985, p.99-102] MIP 1849	Minsk, L.D., [1980, 14p.] SR 80-2
Construction materials data base for Pittsburgh, PA. Merry,	Pressure ridge strength in the Beaufort Sea. Weeks, W.F.,	Potential icing of the space shuttle external tank. Ferrick M.G., et al, [1982, 305p.] CR 82-2:
C.J., et al, [1986, 87p.] SR 86-08 Pressure	(1985, p.167-172) MP 2121 Mechanical properties of multi-year pressure ridge samples.	How effective are icephobic coatings. Minsk, L.D., [1983, p.93-95] MP 163
Review of the propagation of inelastic pressure waves in snow.	Richter-Menge, J.A., [1985, p.244-251] MP 1936	Application of a block copolymer solution to ice-prone struc
Albert, D.G., [1983, 26p.] CR \$3-13 Pressure control	Pressure ridge and sea ice properties Greenland Sea. Tucker, W.B., et al, [1985, p.214-223] MP 1935	tures. Hanamoto, B., [1983, p.155-158] MP 163 Aerostat icing problems. Hanamoto, B., [1983, 29p.]
Freeze damage prevention in utility distribution lines. McFadden, T., [1977, p.221-231] MP 929	Tensile strength of multi-year pressure ridge sea ice samples. Cox, G.F.N., et al, (1985, p.375-380) MP 1988	SR 83-2
McFadden, T., [1977, p.221-231] MP 929 Pressure ridges	Structure, salinity and density of multi-year sea ice pressure	Ice observation program on the semisubmersible drilling vessel SEDCO 708. Minsk, L.D., [1984, 14p.]
Classification and variation of sea ice ridging in the Arctic	ridges. Richter-Menge, J.A., et al, [1985, p.493-497] MP 1965	SR 84-0
basin. Hibler, W.D., III, et al, [1974, p.127-146] NEP 1022	Confined compressive strength of multi-year pressure ridge	Polyethylene glycol as an ice control coating. Itagaki, K. [1984, 11p.] CR 84-2
Height variation along sea ice pressure ridges. Hibler, W.D., III, et al, (1975, p.191-199) MP 848	sea ice samples. Cox, G.P.N., et al, [1986, p.365-373] MP 2635	Protective vegetation
Grounded floebergs near Prudhoe Bay, Alaska. Kovacs, A.,	Probes	Revegetation and erosion control of the Trans-Alaska Pipe line. Johnson, L.A., et al, [1977, 36p.] SR 77-0
et al, (1976, 10p.) CR 76-34 Some characteristics of grounded floebergs near Prudhoe Bay,	Construction and performance of platinum probes for measurement of redox potential. Blake, B.J., et al., [1978, 8p.]	Pumps
Alaska. Kovacs, A., et al, [1976, p.169-172] MP 1118	SR 78-27 Permafrost beneath the Beaufort Sea: near Prudhoe Bay,	Measuring unmetered steam use with a condensate pum cycle counter. Johnson, P.R., [1977, p.434-442]
Grounded ice along the Alaskan Beaufort Sea coast. Kovaca,	Alaska. Sellmann, P.V., et al. (1980, p.35-48)	MP 95
A., [1976, 21p.] CR 76-32	MP 1346 Professional personnel	Waste heat recovery for heating purposes. Phetteplace, G (1978, p.30-33) MP 125
Sea ice properties and geometry. Weeks, W.F., {1976, p.137-171} MIP 918	Architects and scientists in research for design of buildings in	Bubblers and pumps for melting ice. Ashton, G.D., 1986, p.223-2341 MP 213
Sea ice roughness and floe geometry over continental shelves. Weeks, W.F., et al., (1977, p.32-41) MP 1163	Alaska. Ledbetter, C.B., [1977, 8p.] CR 77-23 Profiles	p.223-234 ₁ MIP 213 Quarts
Radar profile of a multi-year pressure ridge fragment.	Iceberg thickness profiling. Kovacs, A., [1978, p.766-774]	Mechanisms of crack growth in quartz. Martin, R.J., III, e
Kovacs, A., (1978, p.59-62) MP 1126 Profiles of pressure ridges and ice islands in the Beaufort Ses.	MP 1019 Profiles of pressure ridges and ice islands in the Beaufort Sea.	al, [1975, p.4837-4844] MP 85: Roder
Hnatiuk, J., et al., (1978, p.519-532) MP 1187	Hnatiuk, J., et al. (1978, p.519-532; MIP 1187	Extending the useful life of DYE-2 to 1986. Tobiasson, W.
Sea ice pressure ridges in the Beaufort Sea. Wright, B.D., et al., r1978, p.249-271; MP 1132	Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al, [1979, 24p.] CR 79-66	et al, [1980, 37p.] SR 80-1: Radar echoes
Sea ice north of Alaska. Kovaca, A., (1978, p.7-12)	Sea ice ridging over the Alaskan continental shelf. Tucker,	Imaging radar observations of frozen Arctic lakes. Blach
MP 1252 Dynamics of near-shore ice. Kovacs, A., et al, [1978, p.11-	W.B., et al., [1979, p.4885-4897] MP 1240 Condensate profiles over Arctic leads. Andreas, E.L., et al.	C., et al, [1976, p.169-175] MIP 128 Dynamics of near-shore ice. Kovacs, A., et al, [1977,
22 ₁ MIP 1205	[1981, p.437-460] MIP 1479	p.106-112 ₁ MIP 92
Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al. [1979, 24p.] CR 79-06	Pooling of oil under sea ice. Kovaca, A., et al. (1981, p.912- 922) MP 1459	Sea ice thickness profiling and under-ice oil entrapment Kovaca, A., [1977, p.547-550] MP 94
Multi year pressure ridges in the Canadian Beaufort Sea.	Electromagnetic subsurface measurements. Dean, A.M., Jr.,	Iceberg thickness profiling using an impulse radar. Kovacı
Wright, B., et al, [1979, p.107-126] MP 1229 See ice ridging over the Alaskan continental shelf. Tucker,	[1981, 19p.] SR 81-23 Snowpack profile analysis using extracted thin sections.	A., [1977, p.140-142] MP 101 Dielectric constant and reflection coefficient of snow surface
W.B., et al. (1979, p.4885-4897) MP 1240	Harrison, W.L., [1982, 15p.] SR 82-11	layers in the McMurdo Ice Shelf. Kovacs, A., et al, (1977,
Ice pile-up and ride-up on Arctic and subarctic beaches. Kovaca, A., et al. (1979, p.127-146) MP 1230	Projectile penetration Projectile and fragment penetration into ordinary snow.	p.137-138 ₁ MP 101 Dynamics of near-shore ice. Kovacs, A., et al, 1977,
Dynamics of near-shore ice. Kovacs, A., et al, [1979,	Swinzow, G.K., (1977, 30p.) MP 1750	p.503-510 ₃ MP 120
p.181-207; MP 1291 Shore ice pile-up and ride-up: field observations, models,	Terminal ballistics in cold regions materials. Aitken, G.W., [1978, 6p.] MP 1182	loeberg thickness and crack detection. Kovacs, A., [1978, p.131-145] MP 112
theoretical analyses. Kovacs, A., et al, [1980, p.209-	Bullet penetration in snow. Cole, D.M., et al, [1979, 23p.]	Iceberg thickness profiling. Kovacs, A., [1978, p.766-774]

Radar anisotropy of sea ice. Kovacs, A., et al, (1978, p.171- 201) MP 1111	Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al, [1979, 30p.] CR 79-15	Mesoscale deformation of sea ice from satellite imagery. Anderson, D.M., et al. r1973, 2p.; MP 1120
Radar profile of a multi-year pressure ridge fragment.	Low frequency surface impedance measurements. Arcone,	Anderson, D.M., et al, [1973, 2p.] MP 1120 Arctic and subarctic environmental analyses from ERTS im-
Kovaca, A., (1)78, p.59-621 MP 1126	S.A., et al, [1980, p.1-9] MP 1280	agery. Anderson, D.M., et al, [1973, 6p.] MP 1831
See ice north of Alaska. Kovacs, A., [1978, p.7-12]	VHF electrical properties of frozen ground near Point Barrow,	ERTS mapping of Arctic and subarctic environments. And-
MP 1252	Alaska. Arcone, S.A., et al, [1981, 18p.] CR 81-13	erson, D.M., et al, [1974, 128p.] MP 1847
Dynamics of near-shore ice. Kovacs, A., et al, [1978, p.11- 22] MP 1205	Electrical properties of frozen ground, Point Barrow, Alaska. Arcone, S.A., et al, [1982, p.485-492] MP 1572	Land use/vegetation mapping in reservoir management. Cooper, S., et al. r1974, 30p.; MP 1039
Remote detection of water under ice-covered lakes on the	Field dielectric measurements of frozen silt using VHF pulses.	Cooper, S., et al., [1974, 30p.] MIP 1839 Remote sensing program required for the AIDJEX model.
North Slope of Alaska. Kovacs, A., [1978, p.448-458]	Arcone, S.A., et al, [1984, p.29-37] MP 1774	Wocks, W.F., et al, (1974, p.22-44) MP 1948
MP 1214	Pulse transmission through frozen silt. Arcone, S.A.,	Near real time hydrologic data acquisition utilizing the
Radar anisotropy of sea ice. Kovacs, A., et al, [1978, p.6037-6046] MP 1139	[1984, 9p.] CR 84-17	LANDSAT system. McKim, H.L., et al, [1975, p.200-
p.6037-6046 ₂ MP 1139 Remote sensing of massive ice in permafrost along pipelines	Radiometry	211 ₃ MP 1055
in Alaska. Kovacs, A., et al, [1979, p.268-279]	Remote sensing of water quality using an airborne spec- troradiometer. McKim, H.L., et al, [1980, p.1353-1362]	Ice dynamics, Canadian Archipelago and adjacent Arctic ba- sin. Ramseier, R.O., et al, [1975, p.853-877]
MP 1175	MP 1491	MP 1585
Freshwater pool radar-detected near an Alaskan river delta.	Summer conditions in the Prudhoe Bay area, 1953-75. Cox,	Remote sensing plan for the AIDJEX main experiment.
Kovacs, A., et al. [1979, p.161-164] MP 1224	G.F.N., et al, [1981, p.799-808] MIP 1457	Weeks, W.F., et al, [1975, p.21-48] MP 862
Surface-based scatterometer results of Arctic sea ice. On- stott, R.G., et al, [1979, p.78-85] MP 1260	Water quality monitoring using an airborne spectroradiome-	Applications of remote sensing in New England. McKim,
Anisotropic properties of sea ice. Kovacs, A., et al, [1979,	ter. McKim, H.L., et al, [1984, p.353-360] MP 1718	H.L., et al. [1975, 8p. + 14 figs. and tables] MP 913 Site access for a subarctic research effort. Slaughter, C.W.,
p.5749-5759j MP 1258	Remote sensing data for water masses in Delaware Bay and	[1976, 13p.] CR 76-69
Inlet current measured with Seasat-1 synthetic sperture radar.	adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-	Islands of grounded sea ice. Dehn, W.F., et al, [1976, p.35-
Shemdin, O.H., et al, [1980, p.35-37] MP 1443 Method for measuring brash ice thickness with impulse radar.	1129 ₁ MP 1909	50 ₁ MP 987
Martinson, C.R., et al, [1981, 10p.] SR 81-11	Thermal emissivity of diathermanous materials. Munis, R.H., et al, [1985, p.872-878] MP 1963	Techniques for studying sea ice drift and deformation at sites
Distortion of model subsurface radar pulses in complex die-	Radiosondes	far from land using LANDSAT imagery. Hibler, W.D., III, et al, [1976, p.595-609] MP 866
lectrics. Arcone, S.A., [1981, p.855-864] MP 1472	Atmospheric dynamics in the antarctic marginal ice zone.	Land use and water quality relationships, eastern Wisconsin.
Ice-covered North Slope lakes observed by radar. Weeks,	Andreas, E.L., et al, [1984, p.649-661] MIP 1667	Haugen, R.K., et al, [1976, 47p.] CR 76-30
W.F., et al, [1981, 17p.] CR 81-19 Reder detection of see ice and current alinement under the	Railroads	Remote-reading tensiometer for use in subfreezing tempera-
Radar detection of sea ice and current alinement under the Ross Ice Shelf. Morey, R.M., et al, [1981, p.96-97]	Snow and ice control on railroads, highways and airports.	tures. McKim, H.L., et al, [1976, p.31-45] MP 897
MP 1543	Minsk, L.D., et al, [1981, p.671-706] MIP 1447	Imaging radar observations of frozen Arctic lakes. Elachi,
Dielectric properties of thawed active layers. Arcone, S.A.,	Roof loads resulting from rain on anow. Colbeck, S.C.,	C., et al., [1976, p.169-175] MIP 1284 Dynamics of pass-show ice. Weeks W.F. et al. 1976
et al, [1982, p.618-626] MP 1547	(1977, p.482-490) MP 982	Dynamics of near-shore ice. Weeks, W.F., et al, [1976, p.267-275] MP 922
Effects of conductivity on high-resolution impulse radar sounding. Morey, R.M., et al, [1982, 12p.]	Loading on the Hartford Civic Center roof before collapse.	Analysis of snow water equivalent using LANDSAT data.
CR 82-42	Redfield, R., et al, [1979, 32p.] SR 79-09	Merry, C.J., et al, [1977, 16 leaves] MP 1113
Radar profiling of buried reflectors and the groundwater table.	Recrystallization	Remote sensing of frazil and brash ice in the St. Lawrence
Sellmann, P.V., et al, [1983, 16p.] CR 83-11	Compressibility characteristics of compacted snow. Abele, G., et al, [1976, 47p.] CR 76-21	River. Dean, A.M., Jr., [1977, 19p.] CR 77-06
Detection of cavities under concrete pavement. Kovacs, A., et al., [1983, 41p.] CR 83-18	Growth of faceted crystals in a anow cover. Colbeck, S.C.,	Remote sensing of accumulated frazil and brash ice. Dean, A.M., Jr., (1977, p.693-704) MP 934
et al, [1983, 41p.] CR 83-18 Radar wave speeds in polar glaciers. Jezek, K.C., et al,	[1982, 19p.] CR 82-29	Applications of remote sensing in the Boston Urban Studies
[1983, p.199-208] MP 2057	Reflection	Program, Parts I and II. Merry, C.J., et al, (1977, 36p.)
Changes in the Ross Ice Shelf dynamic condition. Jezek,	Near-infrared reflectance of snow-covered substrates. O'-	CR 77-13
K.C., [1984, p.409-416] MP 2058	Brien, H.W., et al, [1981, 17p.] CR 81-21 Discrete reflections from thin layers of snow and ice. Jezek,	Integrated approach to the remote sensing of floating ice.
Radar investigations above the trans-Alaska pipeline near	K.C., et al, [1984, p.323-331] MP 1871	Campbell, W.J., et al., [1977, p.445-487] MP 1069
Fairbanks. Arcone, S.A., et al, [1984, 15p.] CR 84-27	Reflectivity	Investigation of an airborne resistivity survey conducted at very low frequency. Arcone, S.A., [1977, 48p.]
Discrete reflections from thin layers of snow and ice. Jezek,	Red and near-infrared spectral reflectance of anow. O'Brien,	CR 77-20
K.C., et al, [1984, p.323-331] MP 1871	H.W., et al, [1975, p.345-360] MIP 872	Detection of moisture in construction materials. Morey,
Borehole geometry on the Greenland and Antarctic ice	Radar imagery of ice covered North Slope lakes. Weeks,	R.M., et al, [1977, 9p.] CR 77-25
sheets. Jezek, K.C., [1985, p.242-251] MP 1817	W.F., et al, (1977, p.129-136) MIP 923	Landsat data for watershed management. Cooper, S., et al., r1977, c150p., MP 1114
Impulse radar sounding of frozen ground. Kovacs, A., et al, [1985, p.28-40] MP 1952	Observations of the ultraviolet spectral reflectance of snow. O'Brien, H.W., [1977, 19p.] CR 77-27	(1977, c150p.) MP 1114 Inundation of vegetation in New England. McKim, H.L., et
Analysis of wide-angle reflection and refraction measure-	Snowpack optical properties in the infrared. Berger, R.H.,	al, [1978, 13p.] MP 1169
menta. Morey, R.M., et al, [1985, p.53-60]	[1979, 16p.] CR 79-11	Automatic data collection equipment for oceanographic ap-
MP 1953	Refraction	plication. Dean, A.M., Jr., [1978, p.1111-1121]
Mine detection in cold regions using short-pulse radar. Arcone, S.A., [1985, 16p.] SR 85-23	Atmospheric turbulence measurements at SNOW-ONE-B.	MP 1028
Radar photography	Andreas, E.L., (1983, p.81-87) MP 1846 Refrigeration	1977 tundra fire in the Kokolik River area of Alaska. Hall, D.K., et al, [1978, p.54-58] MP 1125
AIDJEX radar observations. Thompson, T.W., et al, (1972,	Ice engineering facility heated with a central heat pump sys-	Landsat data analysis for New England reservoir manage-
p.1-16 ₁ MP 989	tem. Aamot, H.W.C., et al, [1977, 4p.] MP 939	ment. Merry, C.J., et al, [1978, 61p.] SR 78-06
Radar imagery of ice covered North Slope lakes. Weeks,	Data acquisition in USACRREL's flume facility. Daly, S.F.,	Remote sensing for reconnaissance of proposed construction
W.F., et al, [1977, p.129-136] MP 923	et al, [1985, p.1053-1058] MP 2089	site. McKim, H.L., et al., [1978, 9 leaves] MP 1167
Radiation Radiation and evaporation heat loss during ice fog conditions.	Regulation	Water resources by satellite. McKim, H.L., (1978, p.164- 169) MP 1090
McFadden, T., [1975, p.18-27] MP 1051	Heat transfer in drill holes in Antarctic ice. Yen, YC., et al, [1976, 15p.] CR 76-12	Estuarine processes and intertidal habitats in Grays Harbor,
Radiation absorption	Regelation and the deformation of wet snow. Colbeck, S.C.,	Washington: a demonstration of remote sensing techniques.
Effects of radiation penetration on anowmelt runoff hydro-	et al, [1978, p.639-650] MP 1172	Gatto, L.W., [1978, 79p.] CR 78-18
graphs. Colbeck, S.C., (1976, 9p.) CR 76-11	Numerical solutions for a rigid-ice model of secondary frost	1977 tundra fire at Kokolik River, Alaska. Hall, D.K., et al.
Ice fog as an electro-optical obscurant. Koh, G., [1985, 11p.] CR 85-08	heave. O'Neill, K., et al, [1982, 11p.] CR 82-13	[1978, 11p.] SR 78-10 Remote sensing for land treatment site selection. Merry,
Rediction belance	Reinforced concretes Deteriorated concrete panels on buildings at Sondrestrom,	C.J., [1978, p.107-119] MP 1146
Micrometeorological investigations near the tundra surface.	Greenland. Korhonen, C., [1984, 11p.] SR 84-12	River channel characteristics at selected ice jam sites in Ver-
Kelley, J.J., [1973, p.109-126] MP 1006	Deteriorated building panels at Sondrestrom, Greenland.	mont. Gatto, L.W., [1978, 52p.] CR 78-25
Energy exchange over antarctic sea ice in the spring. An-	Korhonen, C., (1985, p.7-10) MP 2017	Remote detection of water under ice-covered lakes on the
dreas, E.L., et al, (1985, p.7199-7212) MP 1889 Radio communication	Brittleness of reinforced concrete structures under arctic conditions. Kivekiis, L., et al, [1985, 28 + 14p.]	North Slope of Alaska. Kovaca, A., [1978, p.448-458] MP 1214
Low frequency surface impedance measurements. Arcone,	MP 1969	Remote sensing of massive ice in permafrost along pipelines
S.A., et al, [1980, p.1-9] MP 1280	Reinforcement (structures)	in Alaska. Kovacs, A., et al, [1979, p.268-279]
Transfer of meteorological data from mountain-top sites.	Cantilever beam tests on reinforced ice. Ohstrom, E.G., et	MIP 1175
Govoni, J.W., et al, [1986, 6p.] MP 2107	al, (1976, 12p.) CR 76-07	Landsat data collection platform, south central Alaska. Haugen, R.K., et al., [1979, 17 refs.] SR 79-02
Radio echo soundings	Relaxation (mechanics)	Overview on the seasonal sea ice zone. Weeks, W.F., et al.
Internal properties of the ice sheet at Cape Folger by radio echo sounding. Keliher, T.E., et al, [1978, 12p.]	Mass transfer along ice surfaces. Tobin, T.M., et al, (1977, p.34-37) MP 1091	(1979, p.320-337) MP 1320
CR 78-04	Ultrasonic tests of Byrd Station ice cores. Gow, A.J., et al,	Dynamics of near-shore ice. Kovacs, A., et al, [1979,
Ice sheet internal reflections. Ackley, S.F., et al, 1979,	[1979, p.147-153] MP 1282	p.181-207 ₁ MP 1291
p.5675-5680 ₁ MP 1319	Remote sensing	Survey of methods for soil moisture determination. Schmugge, T.J., et al, [1979, 74p.] MP 1639
Radio echo sounding in the Allan Hills, Antarctica. Kovacs, A., [1980, 9p.] SR 80-23	Progress report on ERTS data on Arctic environment. Anderson, D.M., et al., r1972, 3p., MP 991	Recovery of the Kokolik River tundra area, Alaska. Hall,
Ice flow leading to the deep core hole at Dye 3, Greenland.	erson, D.M., et al, [1972, 3p.] MP 991 Arctic and subarctic environmental analysis through ERTS-	D.K., et al, [1979, 15p.] MP 1638
Whillans, I.M., et al, (1984, p.185-190) MP 1824	1 imagery. Anderson, D.M., et al, [1972, p.28-30]	Remote sensing of water circulation in Grays Harbor, Wash-
Radio waves	MP 1119	ington. Gatto, L.W., [1980, p.289-323] MP 1283
Electrical ground impedance measurements in Alaskan per-	Permafrost and vegetation maps from ERTS imagery. And-	Mapping of the LANDSAT imagery of the Upper Susitna
mafrost regions. Hoekstra, P., [1975, 60p.] MP 1049	erson, D.M., et al, [1973, 75p.] MP 1003 Arctic and subarctic environmental analyses utilizing ERTS-	River. Gatto, L.W., et al. [1980, 41p.] CR 80-04 Physical properties of sea ice and under-ice current orienta-
Electrical ground impedance. Arcone, S.A., et al, [1978,	1 imagery. Anderson, D.M., et al., [1973, 5p.]	tion. Kovaca, A., et al., [1980, p.109-153] MP 1323
92p-1 MP 1221	A>:	
	MP 1611	Remote sensing of revegetation of burned tundra, Kokolik
Electrical resistivity of frozen ground. Arcone, S.A., (1979, p.32-37) MP 1623	Arctic and subarctic environmental analyses. D.M., et al, [1973, 3p.] MP 1030	River, Alaska. Hall, D.K., et al, (1980, p.263-272) MP 1391

Remote consing (cont.)	Summary of the 1971 US Tundra Biome Program. Brown, J., 1972, p.306-313; MIP 995	Bibliography of soil conservation activities in USSR perma-
Remote sensing of water quality using an airborne spectroradiometer. McKim, H.L., et al, [1980, p.1353-1362]	J., t1972, p.306-313; MP 995 Micrometeorological investigations near the tundra surface.	frost areas. Andrews, M., [1977, 116p.] SR 77-67 Biological restoration strategies in relation to nutrients at a
MP 1491	Kelley, J.J., [1973, p.109-126] MP 1006	subarctic site in Fairbanks, Alaska. Johnson, L.A., [1978,
Remote sensing for earth dam site selection and construction	Pedologic investigations in northern Alaska. Tedrow, J.C.F.,	p.460-4661 MP 1100
materials. Merry, C.J., et al., (1980, p.158-170)	[1973, p.93-108] MIP 1005	Bibliography of permafrost soils and vegetation in the USSR.
MLP 1310	Vegetative research in arctic Alaska. Johnson, P.L., et al,	Andrews, M., [1978, 175p.] SR 78-19
Snowpack estimation in the St. John River basin. Power,	[1973, p.169-198] MP 1008	Tundra recovery since 1949 near Fish Creek, Alaska. Law-
J.M., et al, [1980, p.467-486] MP 1799	Arctic limnology: a review. Hobbie, J.B., [1973, p.127-	son, D.E., et al, [1978, 81p.] CR 78-28
Continuum sea ice model for a global climate model. Ling.	168 ₁ MP 1007	Recovery of the Kokolik River tundra area, Alaska. Hall,
C.H., et al., [1980, p.187-196] MP 1622 Inlet current measured with Seasat-1 synthetic aperture radar.	Remote sensing program required for the AIDJEX model.	D.K., et al., [1979, 15p.] MP 1638
Shemdin, O.H., et al. (1980, p.35-37) MP 1481	Weeks, W.F., et al, [1974, p.22-44] MP 1040	Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al, [1980, 21p.] CR 80-03
Ice distribution and winter surface circulation, Kachemak	Research activities of U.S. Army Cold Regions Research and	Remote sensing of revegetation of burned tundra, Kokolik
Bay, Alaska. Gatto, L.W., [1981, p.995-1001]	Engineering Laboratory. Buzzell, T.D., (1975, p.9-12) MP 1244	River, Alaska. Hall, D.K., et al, [1980, p.263-272]
MP 1442	Workshop on permafrost-related research and TAPS. [1975,	MP 1391
Sea ice piling at Fairway Rock, Bering Strait, Alaska.	37p. ₁ MP 1122	Environmental engineering, Yukon River-Prudhoe Bay Haul
Kovaca, A., et al, [1981, p.985-1000] MIP 1460	Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-	Road. Brown, J., ed, [1980, 187p.] CR 86-19
Electromagnetic subsurface measurements. Dean, A.M., Jr.,	487 ₁ MP 844	Revegetation along roads and pipelines in Alaska. Johnson,
[1981, 19p.] SR 81-23	High-latitude basins as settings for circumpolar environmen-	L.A., (1980, p.129-150) MP 1353
Sea ice: the potential of remote sensing. Weeks, W.F., [1981, p.39-48] MP 1468	tal studies. Slaughter, C.W., et al, [1975, p.IV/57-	Revegetation along the trans-Alaska pipeline, 1975-1978.
Environmental mapping of the Arctic National Wildlife Ref-	IV/68 ₁ MP 917	Johnson, A.J., [1981, 115p.] CR 81-12
uge, Alaska. Walker, D.A., et al, [1982, 59p. + 2 maps]	Catalog of Snow Research Projects. (1975, 103p.) MP 1129	Stabilizing fire breaks in tundra vegetation. Patterson, W.A., III, et al, [1981, p.188-189] MP 1804
CR \$2-37		Chena River Lakes Project revegetation study—three-year
Size and shape of ice floes in the Baltic Sea in spring. Lep-	Site access for a subarctic research effort. Slaughter, C.W., [1976, 13p.] CR 76-09	summary. Johnson, L.A., et al, (1981, 59p.)
piiranta, M., [1983, p.127-136] MIP 2061	Delineation and engineering characteristics of permafrost	CR 81-18
Use of Landsat data for predicting snowmelt runoff in the	beneath the Beaufort Sea. Selimann, P.V., et al, [1976,	Sewage sludge aids revegetation. Palazzo, A.J., et al, [1982,
upper Saint John River basin. Merry, C.J., et al, 1983,	p.391-408 ₁ MP 1377	p.198-301 ₃ MP 1735
p.519-533 ₁ MP 1694	Influence of grazing on Arctic tundra ecosystems. Batzli,	Recovery and active layer changes following a tundra fire in
Extraction of topography from side-looking satellite systems—a case study with SPOT simulation data. Ungar, S.G.,	G.O., et al, [1976, p.153-160] MP 970	northwestern Alaska. Johnson, L., et al, [1983, p.543-
et al, (1983, p.535-550) MP 1695	Dynamics of near-shore ice. Weeks, W.F., et al, [1976,	547 ₁ MP 1660 Restoration of soldio deades soils with severe studes and
Offshore petroleum production in ice-covered waters. Tuck-	p.267-275 ₁ MP 922	Restoration of acidic dredge soils with sewage aludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28
er, W.B., (1983, p.207-215) MIP 2086	Update on snow load research at CRREL. Tobiasson, W., et	Revegetation along pipeline rights-of-way in Alaska. John-
Landsat-4 thematic mapper (TM) for cold environments.	al, [1977, p.9-13] MP 1142	son, L., [1984, p.254-264] MIP 2113
Gervin, J.C., et al, [1983, p.179-186] MP 1651	Scientists visit Kolyma Water Balance Station in the USSR.	Vegetation recovery in the Cape Thompson region, Alaska.
Optical engineering for cold environments. Aitken, G.W.,	Slaughter, C.W., et al, [1977, 66p.] SR 77-15	Everett, K.R., et al, [1985, 75p.] CR 85-11
ed, (1983, 225p.) MP 1646	Ross Ice Shelf Project environmental impact statement July, 1974. Parker, B.C., et al, [1978, p.7-36] MP 1675	Rheology
Hydrologic forecasting using Landsat data. Merry, C.J., et	Subarctic watershed research in the Soviet Union. Slaugh-	Crystal fabrics of Weat Antarctic ice sheet. Gow, A.J., et al,
al, (1983, p.159-168) MP 1691	ter, C.W., et al, [1978, p.305-313] MP 1273	[1976, p.1665-1677] MP 1382
Science program for an imaging radar receiving station in Alaska. Weller, G., et al., r1983, 45p., MP 1884	Ecological baseline on the Alaskan haul road. Brown, J., ed,	Thermal and creep properties for frozen ground construction.
Alaska. Weller, G., et al, [1983, 45p.] MP 1884 Antarctic sea ice microwave signatures. Comiso, J.C., et al,	[1978, 131p.] SR 78-13	Sanger, F.J., et al, [1978, p.95-117] MP 1624
[1984, p.662-672] MP 1668	Workshop on Ecological Effects of Hydrocarbon Spills in	Rheology of ice. Fish, A.M., [1978, 196p.] MP 1968
Hydrologic modeling from Landsat land cover data.	Alaska. Atlas, R.M., et al, [1978, p.155-157]	Thermal and creep properties for frozen ground construction.
McKim, H.L., et al, [1984, 19p.] SR 84-01	MP 1183	Sanger, P.J., et al, [1979, p.311-337] MP 1227
Using Landsat data for snow cover/vegetation mapping.	Overview on the seasonal sea ice zone. Weeks, W.F., et al,	Acoustic emission response of snow. St. Lawrence, W.F., [1980, p.209-216] MIP 1366
Merry, C.J., et al, [1984, p.II(140)-II(144)] MP 1975	[1979, p.320-337] MP 1320	Modeling mesoscale ice dynamics. Hibler, W.D., III, et al.
Geographic features and floods of the Ohio River. Edwardo,	Snow and the organization of snow research in the United	[1981, p.1317-1329] NIP 1526
H.A., et al, [1984, p.265-281] MP 2983	States. Colbeck, S.C., [1979, p.55-58] MP 1262	Acoustic emissions during creep of frozen soils. Fish, A.M.,
Wildlife habitat mapping in Lac qui Parle, Minnesota. Mer-	Focus on U.S. snow research. Colbeck, S.C., [1979, p.41-52] MP 1261	et al, [1982, p.194-206] MP 1495
ry, C.J., et al, [1984, p.205-208] MP 2085	•	Creep behavior of frozen silt under constant uniaxial stress.
Potential use of SPOT HRV imagery for analysis of coastal	Air-ice-ocean interaction in Arctic marginal ice zones. Wadhams, P., ed, [1981, 20p.] SR 81-19	Zhu, Y., et al, [1984, p.33-48] MP 1807
sediment plumes. Band, L.E., et al, [1984, p.199-204] MP 1744	National Chinese Conference on Permafrost, 2nd, 1981.	Analysis of linear sea ice models with an ice margin. Lep-
Spatial analysis in recreation resource management. Edwar-	Brown, J., et al, [1982, 58p.] SR 82-03	pliranta, M., [1984, p.31-36] MP 1782
do, H.A., et al. (1984, p.209-219) MP 2084		Modeling the resilient behavior of frozen soils using unfrozen
Radar investigations above the trans-Alaska pipeline near	Science program for an imaging radar receiving station in Alaska. Weller, G., et al, [1983, 45p.] MP 1884	water content. Cole, D.M., [1984, p.823-834] MP 1715
Fairbanks. Arcone, S.A., et al, [1984, 15p.]	Reservoirs	Ice dynamics. Hibler, W.D., III, [1984, 52p.]
CR 84-27	Skylab imagery: Application to reservoir management in New	M 84-03
Mesoscale air-ice-ocean interaction experiments. Johannesen, O.M., ed, [1984, 176p.] SR 84-29	England. McKim, H.L., et al, (1976, 51p.)	Thermodynamic model of creep at constant stress and con-
nessen, O.M., ed, [1984, 176p.] SR 84-29 Discrete reflections from thin layers of snow and ice. Jezek,	SR 76-07	stant strain rate. Fish, A.M., [1984, p.143-161]
K.C., et al, [1984, p.323-331] MP 1871	Environmental analyses in the Kootenai River region, Montana. McKim, H.L., et al., [1976, 53p.] SR 76-13	MP 1771
Use of remote sensing for the U.S. Army Corps of Engineers		
		Creep model for constant stress and constant strain rate.
dredging program. McKim, H.L., et al, [1985, p.] 141-	Slumping failure of an Alaskan earth dam. Collins, C.M., et	Fish, A.M., [1984, p.1009-1012] MP 1766
dredging program. McKim, H.L., et al., [1985, p.1141- 1150] MP 1890	Slumping failure of an Alaskan earth dam. Collins, C.M., et al. (1977, 21p.) SR 77-21 Landsat data analysis for New England reservoir manage-	Fish, A.M., [1984, p.1009-1012] MP 1766 foe flow leading to the deep core hole at Dye 3, Greenland.
1150 ₁ MP 1890 Measuring multi-year sea ice thickness using impulse radar.	Slumping failure of an Alaskan earth dam. Collins, C.M., et al. (1977, 21p.) SR 77-21 Landsat data analysis for New England reservoir manage-	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al, [1984, p.185-190] MP 1824
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al. (1985, p.55-67) MP 1916	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., [1977, 21p.] SR 77-21 Landsat data analysis for New England reservoir management. Merry, C.J., et al., [1978, 61p.] SR 78-06 Limnology and primary productivity, Lake Koocanusa, Mon-	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland Whillams, I.M., et al, [1984, p.185-190] MP 1824 Preliminary investigation of thermal ice pressures. Cox,
1150 ₁ MP 1890 Measuring multi-year sea ice thickness using impulse radar. Measuring multi-year sea ice thickness using impulse radar. MP 1916 Air-ice ocean interaction in Arctic marginal ice zones:	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p., 12p.,	Fish, A.M., (1984, p.1009-1012) MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) MP 1788 On the rheology of a broken ice field due to floe collision.
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al. (1985, p.55-67) MP 1916	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) SR 77-21 Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 82-15 Water quality measurements at six reservoirs. Parker, L.V.,	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., [1984, p.185-190] MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] MP 1788 On the rheology of a broken ice field due to floe collision. Shen, H., et al., [1984, p.29-34] MP 1812
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al. [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed. [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al,	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., [1977, 2]p.] Landsat data analysis for New England reservoir management. Merry, C.J., et al., [1978, 6]p.] SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., [1982, 106p.] Water quality measurements at six reservoirs. Parker, L.V., et al., [1982, 55p.] SR 82-36	Fish, A.M., (1984, p.1009-1012) MP 1766 for flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) MP 1788 On the rheology of a broken ice field due to floe collision. Shen, H., et al, (1984, p.29-34) MP 1812 Foundations in permafrost and seasonal frost; Proceedings.
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MIZEN-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834]	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) Limnology and primary productivity, Lake Koocanuse, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., SR 82-36 Reservoir bank erosion caused and influenced by ice cover.	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) MP 1788 On the rheology of a broken ice field due to floe collision. Shen, H., et al, [1984, p.29-34] MP 1812 Foundations in permafrost and seasonal frost; Proceedings, [1985, 62p.] MP 1730
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al., [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed., [1985, 119p.] SR 85-66 Dielectric measurements of snow cover. Burns, B.A., et al., [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985.	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 82-15 Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-31	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., [1984, p.185-190] MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] MP 1788 On the rheology of a broken ice field due to floe collision. Shen, H., et al., [1984, p.29-34] MP 1812 Foundations in permafrost and seasonal frost; Proceedings, [1985, 62p.] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al., [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al., [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) SR 77-21 Landsat data analysis for New England reservoir management. Merry, C.J., et al., [1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., [1982, 106p.] Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank crosion caused and influenced by ice cover. Gatto, L.W., [1982, 26p.] SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto,	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) On the rheology of a broken ice field due to floe collision. Shen, H., et al, (1984, p.29-34) MP 1812 Poundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) MP 1730 Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) MP 1844
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] Blectromagnetic properties of multi-year sea ice. Morey,	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 82-15 Water quality measurements at six reservoirs. Parker, L.V., SR 82-30 Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) On the rheology of a broken ice field due to floe collision. Shen, H., et al., (1984, p.29-34) Foundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) MP 1730 Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335-1337) MP 1844 River beatss
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al., [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed., [1985, 119p.] SR 85-66 Dielectric measurements of snow cover. Burns, B.A., et al., (1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al., [1985, p.151-167] MP 1902	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Linnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) SR 82-15 Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., et al., (1982, 26p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) Spatial analysis in recreation resource management. Edwar-	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., [1984, p.185-190] MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., [1984, p.221-229] MP 1780 On the rheology of a broken ice field due to floe collision. Shen, H., et al., [1984, p.29-34] MP 1812 Foundations in permafrost and seasonal frost; Proceedings, [1985, 62p.] MP 1730 Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] River basins Permafrost distribution on the continental shelf of the Beau-
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burna, B.A., et al, [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Ice electrical properties. Gow, A.J., [1985, p.76-82]	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 25p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) MP 2084	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) On the rheology of a broken ice field due to floe collision. Shen, H., et al., (1984, p.29-34) Foundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) MP 1730 Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335-1337) MP 1844 River beatss
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Ide conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Ide electrical properties. Gow, A.J., [1985, p.76-82] MP 1910	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanuse, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) MP 2984 Reservoir bank erosion caused by ice. Gatto, L.W., (1984,	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) On the rheology of a broken ice field due to floe collision. Shen, H., et al, (1984, p.29-34) Foundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) MP 1730 Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, flow pressures. Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al, (1979, p.135-141) MP 1288
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al., [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhama, P., ed., [1985, 119p.] SR 85-66 Dielectric measurements of snow cover. Burns, B.A., et al., (1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., (1985, p.856-861) MP 1914 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al., [1985, p.151-167] MP 1902 Ice electrical properties. Gow, A.J., [1985, p.76-82, MP 1910 Remote sensing data for water masses in Delaware Bay and	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) MP 2084 Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214)	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Co., G.F.N., (1984, p.22-1229) On the rheology of a broken ice field due to floe collision. Shen, H., et al, [1984, p.29-34] MP 1812 Foundations in permafrost and seasonal frost; Proceedings. [1985, 62p.] Rheology of glacier ice. Jezek, K.C., et al, [1985, p.1335-1337] River basins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al, [1979, p.135-141]
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Ide conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Ide electrical properties. Gow, A.J., [1985, p.76-82] MP 1910	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanuse, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) MP 2984 Reservoir bank erosion caused by ice. Gatto, L.W., (1984,	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, MP 1788 On the rheology of a broken ice field due to floe collision. Shen, H., et al., (1984, p.29-34) Foundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) MP 1730 Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335- 1337; Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335- MP 1844 River beains Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al., (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al., (1980, p.467-486) MP 1799 Hydrologic modeling from Landsat land cover data.
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Ice electrical properties. Gow, A.J., [1985, p.76-82] Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredge-	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 106p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) MP 2084 Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) MP 1787 Erosion of northern reservoir shores. Lawson, D.E., (1985, 1989.) Resteential buildings	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.28-24) On the rheology of a broken ice field due to floe collision. MP 1812 Poundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) MP 1844 River basins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al, (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al, (1980, p.467-486) Hydrologic modeling from Landsat land cover data McKim, H.L., et al, (1984, 199.)
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al, [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] In P 1913 Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] Rectromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1910 Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.]	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.P., et al., (1982, 105p.) SR 82-15 Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) SR 82-30 Reservoir bank erosion of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Erosion of northern reservoir shores. Lawson, D.E., (1985, 198p.) Residential buildings Life-cycle cost effectiveness of modular megastructures in	Fish, A.M., (1984, p.1009-1012) MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.22-1229) On the rheology of a broken ice field due to floe collision. Shen, H., et al., (1984, p.29-34) MP 1812 Foundations in permafrost and seasonal frost; Proceedings. (1985, 62p.) MP 1730 Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335-1337) River busins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al., (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River busin. Power, J.M., et al., (1980, p.467-486) MP 1799 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01 River crossings
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al., [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhama, P., ed., [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burna, B.A., et al., (1985, p.829-834) Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1918 Blectromagnetic properties of multi-year sea ice. Morey, R.M., et al., [1985, p.151-167] Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1910 Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al., [1985, p.112-3] MP 1909 Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al., [1985, 42p.] SR 85-20	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., (1983, 103p.) SR 82-33 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.209-219) Reservoir bank erosion caused by ice. Jane 1984, p.203-214 Bresion of northern reservoir shores. Lawson, D.E., (1985, 198p.) Restleential buildings Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., (1976, p.760-776)	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.22-1-229) MP 1788 On the rheology of a broken ice field due to floe collision. Shen, H., et al, [1984, p.29-34] MP 1812 Foundations in permafrost and seasonal frost; Proceedings, [1985, 62p.] MP 1730 Rheology of glacier ice. Jezek, K.C., et al, [1985, p.1335-1337] Rheology of glacier ice. Jezek, K.C., et al, [1985, p.135-1337] River beasins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al, [1979, p.135-141] MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al, [1980, p.467-486] Hydrologic modeling from Landsat land cover data. McKim, H.L., et al, [1984, 19p.] River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1)
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Lee conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] MP 1902 Lee electrical properties. Gow, A.J., [1985, p.76-82] Lee electrical properties. Gow, A.J., [1985, p.1123-1129] Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] SR 85-20 Terrain analysis from space shuttle photographs of Tibet.	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 25p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) SR 82-30 Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) SR 82-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.205-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.205-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.206-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.206-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.206-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.206-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1986, p.206-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1986, p.206-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.206-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1986, p.206-214)	Fish, A.M., (1984, p.1009-1012) MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Co., G.F.N., (1984, p.22-34) MP 1788 On the rheology of a broken ice field due to floe collision. Shen, H., et al., (1984, p.29-34) MP 1781 Foundations in permafrost and seasonal frost; Proceedings. (1985, 62p.) MP 1812 River heatins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al., (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al., (1980, p.467-486) MP 1799 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., (1984, 19p.) River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., [1984,
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al., [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed., [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al., [1985, p.829-834] Ide conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] RP 1913 Ide conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1902 Ide electrical properties of multi-year sea ice. Morey, R.M., et al., [1985, p.151-167] Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al., [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al., [1985, 42p.] Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al., [1986, p.400-409] MP 2097	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) SR 82-30 Sank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Erosion of northern reservoir shores. Lawson, D.E., (1985, 198p.) Residential buildings Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., (1976, p.760-776) MP 892 Resins	Fish, A.M., (1984, p.1009-1012) MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.22-1-229) On the rheology of a broken ice field due to floe collision. Shen, H., et al., (1984, p.29-34) MP 1812 Foundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) MP 1730 Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335-1337) River busins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al., (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River busin. Power, J.M., et al., (1980, p.467-486) MP 1799 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01 River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., [1984, 28p.] SR 84-05
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burna, B.A., et al, [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Catto, L.W., [1985, p.856-861] MP 1913 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1902 Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1919 Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] SR 85-20 Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] Remote sensing of the Arctic seas. Weeks, W.F., et al,	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., (1982, 26p.) SR 82-33 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Erosion of northern reservoir shores. Lawson, D.E., (1985, 198p.) Residential buildings Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., (1976, p.760-776) MP 892 Resins and non-portland cements for construction in the cold.	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) On the rheology of a broken ice field due to floe collision. Shen, H., et al, (1984, p.29-34) MP 1812 Poundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) MP 1844 River beatins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al, (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River beatin. Power, J.M., et al, (1980, p.467-4867) Hydrologic modeling from Landsat land cover data. McKim, H.L., et al, (1984, 19p.) River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al, (1984, 28p.) River flow
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] MP 1916 Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Lee conditions on the Ohio and Illimois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] MP 1902 Lee electrical properties. Gow, A.J., [1985, p.76-82] Lee electrical properties. Gow, A.J., [1985, p.76-82] MP 1910 Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] SR 85-20 Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] MP 2097 Remote sensing of the Arctic seas. Weeks, W.P., et al, [1986, p.39-64]	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 82-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) MP 208-4 Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1986, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1988, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoi	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Co., G.F.N., (1984, p.22-122) On the rheology of a broken ice field due to floe collision. MP 1812 Foundations in permafrost and seasonal frost; Proceedings. (1985, 62p.) Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335-1337) River heatins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al., (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al., (1980, p.467-486) Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., (1984, 19p.) River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) River flow BRTS mapping of Arctic and subarctic environments. And-
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Lee conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] MP 1902 Ice electrical properties. Gow, A.J., [1985, p.76-82] Ice electrical properties. Gow, A.J., [1985, p.76-82] Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] SR 85-20 Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] MP 2097 Remote sensing of the Arctic seas. Weeks, W.F., et al, (1986, p.59-64] MP 2117 Meteorological variation of atmospheric optical properties in an antarctic storm. Egan, W.G., et al, [1986, p.1155-	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.203-219) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Brosion of northern reservoir shores. Lawson, D.E., (1985, 198p.) Residential buildings Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., (1976, p.760-776) MP 892 Resins and non-portland cements for construction in the cold. Johnson, R., (1980, 19p.) SR 89-35 Polyethylene glycol as an ice control coating. Itagaki, K.,	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox., G.F.N., (1984, p.22-1-229) On the rheology of a broken ice field due to floe collision. Shen, H., et al., (1984, p.29-34) Foundations in permafrost and seasonal frost; Proceedings. (1985, 62p.) Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335-1337) Rtver basins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al., (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al., (1980, p.467-486) MP 1799 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., (1984, 19p.) SR 84-01 Rtver crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., [1984, 28p.) Rtver flow ERTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.) MP 1947
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] SR 85-20 Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] Remote sensing of the Arctic seas. Weeks, W.F., et al, (1986, p.59-64) MP 2097 Remote sensing of the Arctic seas. Weeks, W.F., et al, (1986, p.59-64) MP 2117 Meteorological variation of atmospheric optical properties in an antarctic storm. Egan, W.G., et al, [1986, p.1155-1165) MP 2099	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.203-219) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Brosion of northern reservoir shores. Lawson, D.E., (1985, 198p.) Residential buildings Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., (1976, p.760-776) MP 892 Resins and non-portland cements for construction in the cold. Johnson, R., (1980, 19p.) SR 89-35 Polyethylene glycol as an ice control coating. Itagaki, K.,	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Co., G.F.N., (1984, p.22-122) On the rheology of a broken ice field due to floe collision. MP 1812 Foundations in permafrost and seasonal frost; Proceedings. (1985, 62p.) Rheology of glacier ice. Jezek, K.C., et al., (1985, p.1335-1337) River heatins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al., (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al., (1980, p.467-486) Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., (1984, 19p.) River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., (1984, 28p.) River flow BRTS mapping of Arctic and subarctic environments. And-
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Catto, L.W., [1985, p.856-861] MP 1913 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1902 Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1919 Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] SR 85-20 Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] Remote sensing of the Arctic seas. Weeks, W.P., et al, [1986, p.59-64] Meteorological variation of atmospheric optical properties in an antarctic storm. Egan, W.G., et al, [1986, p.1155-1165] MP 2099 Rescus esperations	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.P., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) SR 82-30 Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) MP 2084 Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Brosion of northern reservoir shores. Lawson, D.E., (1985, 198p.) Residential buildings Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., (1976, p.760-776) MP 892 Resins Resins and non-portland cements for construction in the cold. Johnson, R., (1980, 19p.) Residential Life, (1983, 19p.) Residential Life, (1984, 11p.) Revegatation	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Co., G.F.N., (1984, p.221-229) On the rheology of a broken ice field due to floe collision. MP 1812 Poundations in permafrost and seasonal frost; Proceedings. (1985, 62p.) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1341) Rheology of glacier ice. Jezek, K.C., et al, (1979, p.135-141) MP 1844 Sanowpack estimation on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al, (1979, p.135-141) MP 1788 Snowpack estimation in the St. John River basin. Power, J.M., et al, (1980, p.467-4867) Hydrologic modeling from Landsat land cover data. McKim, H.L., et al, (1984, 19p.) River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al, (1984, 28p.) River flow BRTS mapping of Arctic and substractic environments. Anderson, D.M., et al, (1979, 5p.) MP 1047 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al, (1979, 5p.) Harnessing frazil ice. Perham, R.E., (1981, p.227-237)
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Lee conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] MP 1902 Ice electrical properties. Gow, A.J., [1985, p.76-82] Ice electrical properties. Gow, A.J., [1985, p.76-82] Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] Remote sensing of the Arctic seas. Weeks, W.F., et al, (1986, p.59-64] MP 2117 Meteorological variation of atmospheric optical properties in an antarctic storm. Egan, W.G., et al, [1986, p.1155-1165] MP 2099 Rescase operations Detection of sound by persons buried under snow avalanche.	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 82-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) MP 208-4 Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.207-76) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.207-76) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.207-76) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-714) Reservoir b	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al., [1984, p.185-190] MP 1824 Preliminary investigation of thermal ice pressures. Co., G.F.N., [1984, p.221-229] MP 1788 On the rheology of a broken ice field due to floe collision. MP 1812 Poundations in permafrost and seasonal frost; Proceedings. [1985, 62p.] MP 1730 Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] MP 1844 River leastss Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al., [1979, p.135-141] MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al., [1980, p.467-486] Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., [1984, 19p.] SR 84-01 River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., [1984, 28p.] River flow ERTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] Turbulent heat transfer from a river to its ice cover. Hydrologic Representation of the properties of the search of the properties of the search of the properties of the
MP 1890 Measuring multi-year sea ice thickness using impulse radar. Kovaca, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MIZEX-West. Wadhams, P., ed, [1985, 119p.; SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.; SR 85-26 Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] Remote sensing of the Arctic seas. Weeks, W.F., et al, (1986, p.59-64) MP 2097 Remote sensing of the Arctic seas. Weeks, W.F., et al, (1986, p.19-59-49) MP 2117 Meteorological variation of atmospheric optical properties in an antarctic storm. Egan, W.G., et al, [1986, p.1155-1165) MP 2099 Rescus operations Detaction of sound by persons buried under snow avalanche. Johnson, J.B., (1984, p.42-47) MP 1920	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 73-26 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.P., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) SR 82-30 Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Erosion of northern reservoir shores. Lawson, D.E., (1985, 198p.) Residential buildings Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., (1976, p.760-776, MP 892 Resins and non-portland cements for construction in the cold. Johnson, R., (1980, 19p.) Revegetation in arctic and subarctic North America—a literature review. Johnson, L.A., et al., (1976, 32p.) CR 76-15	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillans, I.M., et al., (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox., G.F.N., (1984, p.22-1-229) On the rheology of a broken ice field due to floe collision. Shen, H., et al., [1984, p.29-34] MP 1812 Foundations in permafrost and seasonal frost; Proceedings. [1985, 62p.] MP 1730 Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] Rheology of glacier ice. Jezek, K.C., et al., [1985, p.1335-1337] River basins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al., [1979, p.135-141] MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al., [1980, p.467-486] MP 1799 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., [1984, 19p.] River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., [1984, 28p.] River flow BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] MP 1047 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., [1979, 5p.] River ice suppression by side channel discharge of warm wa-
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Catto, L.W., [1985, p.856-861] MP 1913 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1902 Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1910 Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] MP 2097 Remote sensing of the Arctic seas. Weeks, W.P., et al, (1986, p.59-64) MP 2017 Meteorological variation of atmospheric optical properties in an antarctic storm. Egan, W.G., et al, [1986, p.1155-1155] MP 2099 Rescass operations Detection of sound by persons buried under snow avalanche. Johnson, J.B., (1984, p.42-47) MP 1920 Research projects	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) SR 82-15 Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-30 SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) Reservoir bank erosion caused by ice. p.203-214 Brosion of northern reservoir shores. Lawson, D.E., (1984, p.203-2195) Residential buildings Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., (1976, p.760-776) MP 892 Resins Resins and non-portland cements for construction in the cold. Johnson, R., (1980, 19p.) SR 89-35 Reviewetation Revegetation in arctic and subarctic North America—a literature review. Johnson, L.A., et al., (1976, 32p.) CR 76-15 Evaluation of an air cushion vehicle in Northern Alaska.	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) On the rheology of a broken ice field due to floe collision. MP 1812 Poundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) MP 1844 River beatins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al, (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River beatin. Power, J.M., et al, (1980, p.467-4867) Hydrologic modelling from Landsat land cover data. McKim, H.L., et al, (1984, 19p.) River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al, (1984, 28p.) River flow BRTS mapping of Arctic and substractic environments. Anderson, D.M., et al, (1974, 128p.) MP 1047 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al, (1979, 5p.) Harnessing frazil ice. Perham, R.B., (1981, p.227-237) MP 1328
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Lee conditions on the Ohio and Illimois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] MP 1902 Ice electrical properties. Gow, A.J., [1985, p.76-82] Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1910 Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] MP 2097 Remote sensing of the Arctic seas. Weeks, W.F., et al, (1986, p.39-64) MP 2117 Meteorological variation of atmospheric optical properties in an antarctic storm. Egan, W.G., et al, [1986, p.1155-1165] MP 2099 Rescare sperations Detection of sound by persons buried under snow avalanche. Johnson, J.B., (1984, p.42-47) MP 1920 Rescare projects U.S. Tundra Biome central program 1971 progress report.	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 25p.) SR 82-30 Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) MP 208-4 Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.209-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1985, p.203-214) Reservoir bank erosion caused by ice. Gatto, L.W., (1984, p.207-716) MP 208-4 Resins and non-portland cements for construction in the cold. Johnson, R., (1980, 19p.) Resins and non-portland cements for construction in the cold. Johnson, R., (1980, 19p.) Resins and non-portland cements for construction in the cold. Johnson, R., (1980, 19p.) Revegetation Revegetation in arctic and subarctic North America—a literature review. Johnson, L.A., et al., (1976, 32p.) CR 76-15 Evaluation of an air cushion vehicle in Northern Alaska. Abele, G., et al., (1976, 7p.) MP 294	Fish, A.M., [1984, p.1009-1012] MP 1766 Ice flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al., [1984, p.185-190] MP 1824 Preliminary investigation of thermal ice pressures. Co., G.F.N., [1984, p.221-229] MP 1788 On the rheology of a broken ice field due to floe collision. MP 1812 Foundations in permafrost and seasonal frost; Proceedings. [1985, 62p.] MP 1739 Rheology of glacier ice. Jezek, K.C., et al., [1985, p.133-1] MP 1844 River heatins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkina, D.M., et al., [1979, p.135-141] MP 1288 Snowpack estimation in the St. John River basin. Power, J.M., et al., [1980, p.467-486] MP 1799 Hydrologic modeling from Landsat land cover data. McKim, H.L., et al., [1984, 19p.] SR 84-01 River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al., [1984, 28p.] River flow BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al., [1974, 128p.] Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al., [1979, 5p.] CR 79-13 Harnessing frazil ice. Perham, R.E., [1981, p.227-237] MP 1398 River ice suppression by side channel discharge of warm water. Ashton, G.D., [1982, p.65-80] MP 1528 On zero-inertia and kinematic waves. Katopodes, N.D.,
MP 1890 Messuring multi-year sea ice thickness using impulse radar. Kovacs, A., et al, [1985, p.55-67] Air-ice ocean interaction in Arctic marginal ice zones: MZEX-West. Wadhams, P., ed, [1985, 119p.] SR 85-06 Dielectric measurements of snow cover. Burns, B.A., et al, [1985, p.829-834] Ice conditions on the Ohio and Illinois rivers, 1972-1985. Catto, L.W., [1985, p.856-861] MP 1913 Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1902 Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1910 Remote sensing data for water masses in Delaware Bay and adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-1129] Potential of remote sensing in the Corps of Engineers dredging program. McKim, H.L., et al, [1985, 42p.] Terrain analysis from space shuttle photographs of Tibet. Kreig, R.A., et al, [1986, p.400-409] MP 2097 Remote sensing of the Arctic seas. Weeks, W.P., et al, (1986, p.59-64) MP 2017 Meteorological variation of atmospheric optical properties in an antarctic storm. Egan, W.G., et al, [1986, p.1155-1155] MP 2099 Rescass operations Detection of sound by persons buried under snow avalanche. Johnson, J.B., (1984, p.42-47) MP 1920 Research projects	Slumping failure of an Alaskan earth dam. Collins, C.M., et al., (1977, 21p.) Landsat data analysis for New England reservoir management. Merry, C.J., et al., (1978, 61p.) SR 78-06 Limnology and primary productivity, Lake Koocanusa, Montana. Woods, P.F., et al., (1982, 105p.) SR 82-15 Water quality measurements at six reservoirs. Parker, L.V., et al., (1982, 55p.) Reservoir bank erosion caused and influenced by ice cover. Gatto, L.W., (1982, 26p.) SR 82-30 SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto, L.W., et al., (1983, 103p.) SR 83-30 Spatial analysis in recreation resource management. Edwardo, H.A., et al., (1984, p.209-219) Reservoir bank erosion caused by ice. p.203-214 Brosion of northern reservoir shores. Lawson, D.E., (1984, p.203-2195) Residential buildings Life-cycle cost effectiveness of modular megastructures in cold regions. Wang, L.RL., et al., (1976, p.760-776) MP 892 Resins Resins and non-portland cements for construction in the cold. Johnson, R., (1980, 19p.) SR 89-35 Reviewetation Revegetation in arctic and subarctic North America—a literature review. Johnson, L.A., et al., (1976, 32p.) CR 76-15 Evaluation of an air cushion vehicle in Northern Alaska.	Fish, A.M., (1984, p.1009-1012) Ice flow leading to the deep core hole at Dye 3, Greenland. Whillams, I.M., et al, (1984, p.185-190) MP 1824 Preliminary investigation of thermal ice pressures. Cox, G.F.N., (1984, p.221-229) On the rheology of a broken ice field due to floe collision. MP 1812 Poundations in permafrost and seasonal frost; Proceedings, (1985, 62p.) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) Rheology of glacier ice. Jezek, K.C., et al, (1985, p.1335-1337) MP 1844 River beatins Permafrost distribution on the continental shelf of the Beaufort Sea. Hopkins, D.M., et al, (1979, p.135-141) MP 1288 Snowpack estimation in the St. John River beatin. Power, J.M., et al, (1980, p.467-4867) Hydrologic modelling from Landsat land cover data. McKim, H.L., et al, (1984, 19p.) River crossings Operation of the U.S. Combat Support Boat (USCSBMK 1) on an ice-covered waterway. Stubstad, J., et al, (1984, 28p.) River flow BRTS mapping of Arctic and substractic environments. Anderson, D.M., et al, (1974, 128p.) MP 1047 Turbulent heat transfer from a river to its ice cover. Haynes, F.D., et al, (1979, 5p.) Harnessing frazil ice. Perham, R.B., (1981, p.227-237) MP 1328

Unsteady river flow beneath an ice cover. Ferrick, M.G., et al, [1983, p.254-260] MP 2079	Ice jams and meteorological data for three winters, Ottauque- chee River, Vt. Bates, R.E., et al, [1981, 27p.]	Environmental atlas of Alaska. Hartman, C.W., et a [1978, 95p.] MP 126
Modeling of ice discharge in river models. Calkins, D.J., [1983, p.285-290] MP 2081	CR 81-01 Harnessing frazil ice. Perham, R.E., [1981, p.227-237]	Freshwater ice growth, motion, and decay. Ashton, G.D. [1980, p.261-304] MP 129
Ice jams in shallow rivers with floodplain flow. Calkins, D.J.,	MP 1398	Bank erosion of U.S. northern rivers. Gatto, L.W., [1982]
[1983, p.538-548] MP 1644 Chens Flood Control Project and the Tanana River near Fair-	Ice control arrangement for winter navigation. Perham, R.E., [1981, p.1096-1103] MP 1449	Road icing
banks, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745	Breekup of solid ice covers due to rapid water level variations. Billfalk, L., [1982, 17p.] CR 82-63	Road construction and maintenance problems in central Alaka. Clark, E.F., et al, [1976, 36p.] SR 76-6
Tanana River monitoring and research studies near Fairbanks, Alaska. Neill, C.R., et al, (1984, 98p. + 5 ap-	River ice suppression by side channel discharge of warm water. Ashton, G.D., [1982, p.65-80] MP 1528	Drainage facilities of airfields and heliports in cold region Lobacz, E.F., et al., (1981, 56p.) SR 81-2
pends.; SR 84-37 Modeling rapidly varied flow in tailwaters. Ferrick, M.G., et	Port Huron ice control model studies. Calkins, D.J., et al,	Optimizing deicing chemical application rates. Minsk, L.D.
al, [1984, p.271-289] MP 1711	[1982, p.361-373] MP 1530 Field investigations of a hanging ice dam. Beltace, S., et al.	ISTVS workshop on tire performance under winter cond
Geographic features and floods of the Ohio River. Edwardo, H.A., et al, [1984, p.265-281] MP 2883	[1982, p.475-488] MP 1533 Ottauquechee River—analysis of freeze-up processes. Cal-	tions, 1983. ₍ 1985, 177p. ₎ SR \$5-1 Road maintenance
Analysis of rapidly varying flow in ice-covered rivers. Ferrick, M.G., [1984, p.359-368] MP 1833	kins, D.J., et al, [1982, p.2-37] MP 1738 Force measurements and analysis of river ice break up.	Winter maintenance research needs. Minsk, L.D., 1975, p.36-381 MP 95
Numerical simulation of freeze-up on the Ottauquechee River. Calkins, D.J., [1984, p.247-277] MP 1815	Deck, D.S., [1982, p.303-336] MIP 1739	Haul Road performance and associated investigations in Alac
Computer simulation of ice cover formation in the Upper St.	Theory of thermal control and prevention of ice in rivers and lakes. Ashton, G.D., [1982, p.131-185] MIP 1554	Pothole primer; a public administrator's guide to understand
Lawrence River. Shen, H.T., et al, [1984, p.227-245] MP 1814	Using the DWOPER routing model to simulate river flows with ice. Daly, S.F., et al, [1983, 19p.] SR 83-01	ing and managing the pothole problem. Eaton, R.A coord, [1981, 24p.] MP 141
Effect of ice cover on hydropower production. Yapa, P.D., et al, [1984, p.231-234] MIP 1876	Measurement of ice forces on structures. Sodhi, D.S., et al. [1983, p.139-155] MP 1641	Snow and ice control on railroads, highways and airport Minsk, L.D., et al, [1981, p.671-706] MP 144
Analysis of river wave types. Ferrick, M.G., [1985, p.209-220] MP 1875	Unsteady river flow beneath an ice cover. Ferrick, M.G., et	Snow removal equipment. Minak, L.D., [1981, p.648-670] MP 144
Analysis of river wave types. Ferrick, M.G., (1985, 17p.)	al, [1983, p.254-260] MP 2079 Modeling of ice discharge in river models. Calkins, D.J.,	Guide to managing the pothole problem on roads. Eator
CR 85-12 Hydrologic aspects of ice jams. Calkins, D.J., (1986, p.603-	[1983, p.285-290] MP 2081 Ice jams in shallow rivers with floodplain flow. Calkins, D.J.,	R.A., et al, [1981, 24p.] SR 81-2 Potholes: the problem and solutions. Eaton, R.A., [1982,
609 ₁ MP 2116 Sub-ice channels and frazil bars, Tanana River, Alaska.	[1983, p.538-548] MP 1644 Mechanics of ice jam formation in rivers. Ackermann, N.L.,	p.160-162 ₁ MP 150 Engineer's pothole repair guide. Eaton, R.A., et al, [1984,
Lawson, D.E., et al, [1986, p.465-474] MP 2129	et al, (1983, 14p.) CR 83-31	12p.) TD 84-6 Strategies for winter maintenance of pavements and road
River ice Temperature and flow conditions during the formation of	Navigation ice booms on the St. Marys River. Perham, R.E., [1984, 12p.] CR 84-64	ways. Minak, L.D., et al, [1984, p.155-167] MP 196
river ice. Ashton, G.D., et al, [1970, 12p.] MP 1723	lce-related flood frequency analysis: application of analytical estimates. Gerard, R., et al., [1984, p.85-101]	Comparison of three compactors used in pothole repair
Formation of ice ripples on the underside of river ice covers. Ashton, G.D., [1971, 157p.] MP 1243	MP 1712 St. Lawrence River freeze-up forecast. Shen, H.T., et al,	Seasonal variations in pavement performance. Johnson
Growth and mechanical properties of river and lake ice. Ramseier, R.O., [1972, 243p.] MIP 1883	(1984, p.177-190) MIP 1713	T.C., [1985, c21p.] MP 207 Snow and ice prevention in the United States. Minsk, L.D
Seasonal regime and hydrological significance of stream ic-	Performance of the Allegheny River ice control structure, 1983. Deck, D.S., et al, [1984, 15p.] SR 84-13	[1986, p.37-42] MP 187
ings in central Alaska. Kane, D.L., et al, [1973, p.528- 540] MP 1026	Ice cover melting in a shallow river. Calkins, D.J., [1984, p.255-265] MP 1763	Haul Road performance and associated investigations in Alas
River ice problems. Burgi, P.H., et al, [1974, p.1-15] MP 1002	Ice jams in shallow rivers with floodplain flow: Discussion. Beltace, S., [1984, p.370-371] MP 1798	ka. Berg, R.L., (1980, p.53-100) MP 135 Roads
ERTS mapping of Arctic and subarctic environments. Anderson, D.M., et al, [1974, 128p.] MP 1047	Controlling river ice to alleviate ice jam flooding. Deck, D.S., r1984, p.69-761 MP 1885	Approach roads, Greenland 1955 program. [1959, 100p.] MP 152
Third International Symposium on Ice Problems, 1975.	Ice jam research needs. Gerard, R., [1984, p.181-193]	Heat and moisture flow in freezing and thawing soils—a fiel study. Berg, R.L., [1975, p.148-160] MP 161
Prankenstein, G.E., ed, [1975, 627p.] MP 845 Mechanics and hydraulics of river ice jams. Tatinclaux, J.C.,	MP 1813 Methods of ice control for winter navigation in inland waters.	Road construction and maintenance problems in central Alas
et al, [1976, 97p.] MP 1060 Potential river ice jams at Windsor, Vermont. Calkins, D.J.,	Frankenstein, G.E., et al, [1984, p.329-337] MP 1831 Analysis of rapidly varying flow in ice-covered rivers. Fer-	ka. Clark, E.F., et al, [1976, 36p.] SR 76-0 Pipeline haul road between Livengood and the Yukon Rive
et al, [1976, 31p.] CR 76-31 Force estimate and field measurements of the St. Marys River	rick, M.G., [1984, p.359-368] MP 1833 Field investigation of St. Lawrence River hanging ice dams.	Berg, R.L., et al, [1976, 73p.] SR 76-1 Resiliency in cyclically frozen and thawed subgrade soils
ice booms. Perham, R.E., [1977, 26p.] CR 77-04	Shen, H.T., et al, [1984, p.241-249] MP 1830	Chamberlain, E.J., et al, [1977, p.229-281] MIP 172 Repetitive loading tests on membrane enveloped road set
Remote sensing of frazil and brash ice in the St. Lawrence River. Dean, A.M., Jr., [1977, 19p.] CR 77-06	Rise pattern and velocity of frazil ice. Wuebben, J.L., [1984, p.297-316] MP 1816	tions during freeze thaw. Smith, N., et al, [1977, p.171-197] MP 96
Some economic benefits of ice booms. Perham, R.E., [1977, p.570-591] MP 959	Computer simulation of ice cover formation in the Upper St. Lawrence River. Shen, H.T., et al, [1984, p.227-245]	Load tests on membrane-enveloped road sections. Smith
Yukon River breakup 1976. Johnson, P., et al, 1977, p.592-5961 MP 960	MP 1814 Numerical simulation of freeze-up on the Ottauquechee Riv-	N., et al, [1978, 16p.] CR 78-1 Chemical composition of haul road dust and vegetation. In
Ice breakup on the Chena River 1975 and 1976. McFadden,	er. Calkins, D.J., [1984, p.247-277] MP 1815	kandar, I.K., et al, [1978, p.110-111] MIP 111 Ecology on the Yukon-Prudhoe haul road. Brown, J., ec
T., et al. (1977, 44p.) Visual observations of floating ice from Skylab. Campbell,	Forecasting water temperature decline and freeze-up in rivers. Shen, H.T., et al. £1984, 17p. ₁ CR 84-19	[1978, 131p.] MP 111 Construction on permafrost at Longyearbyen on Spitsberger
W.J., et al, [1977, p.353-379] MP 1263 Physical measurement of see jams 1976-77 field season.	Salmon River ice jams. Cumningham, L.L., et al, [1984, p.529-533] MP 1796	Tobiasson, W., [1978, p.884-890] MP 110
Wuebben, J.L., et al, [1978, 19p.] SR 78-03 Bearing capacity of river ice for vehicles. Nevel, D.E.,	Controlling river ice to alleviate ice jam flooding. Deck, D.S., [1984, p.524-528] MP 1795	Resiliency of silt under asphalt during freezing and thawing Johnson, T.C., et al, [1978, p.662-668] MIP 116
[1978, 22p.] CR 78-03 Arching of model ice floes at bridge piers. Calkins, D.J.,	Bffect of ice cover on hydropower production. Yapa, P.D., et al, 1984, p.231-234; MP 1876	Permafrost and active layer on a northern Alaskan rose Berg, R.L., et al, [1978, p.615-621] MIP 116
[1978, p.495-507] MIP 1134	Mathematical modeling of river ice processes. Shen, H.T.,	Ecological baseline on the Alaskan haul road. Brown, J., ec [1978, 131p.] SR 78-1
Physical measurements of river ice jams. Calkins, D.J., [1978, p.693-695] MP 1159	[1984, p.554-558] MP 1973 Ice block stability. Daly, S.F., [1984, p.544-548]	Freeze thaw loading tests on membrane enveloped road sections. Smith, N., et al, [1978, p.1277-1288]
River ice. Ashton, G.D., [1978, p.369-392] MP 1216 Characteristics of ice on two Vermont rivers. Deck, D.S.,	MP 1972 Unified degree-day method for river ice cover thickness simu-	MP 115 Nondestructive testing of in-service highway pavements is
[1978, 30p.] SR 78-30	lation. Shen, H.T., et al, [1985, p.54-62] MP 2065 Analysis of river wave types. Ferrick, M.G., [1985, 17p.]	Maine. Smith, N., et al, [1979, 22p.] CR 79-0
River ice. Ashton, G.D., 1979, p.38-45, MP 1178 Accelerated ice growth in rivers. Calkins, D.J., 1979, 5p., CR 79-14	CR 85-12	Sulfur foam as insulation for expedient roads. Smith, N., e al, [1979, 21p.] CR 79-1
CR 79-14 Break-up dates for the Yukon River; Pt.2. Alakanuk to Tana-	Ice jam flood prevention measures, Lamoille River, Hardwick VT. Calkins, D.J., (1985, p.149-168) MP 1940	Noncorrosive methods of ice control. Minsk, L.D., [1979, p.133-162] MP 126
na, 1883-1978. Stephens, C.A., et al, [1979, c50 leaves] MP 1318	Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.856-861] MP 1914	Revegetation along roads and pipelines in Alaska. Johnson L.A., [1980, p.129-150] MP 135
Modeling of ice in rivers. Ashton, G.D., [1979, p.14/1-14/26] MP 1335	Construction and calibration of the Ottauquechee River model. Gooch, G., [1985, 10p.] SR 85-13	Environment of the Alaskan Haul Road. Brown, J., (1980,
Break-up of the Yukon River at the Haul Road Bridge: 1979.	Cazenovia Creek Model data acquisition system. Bennett,	Road dust along the Haul Road, Alaska. Everett, K.R.
Stephens, C.A., et al, [1979, 22p. + Figs.] MP 1315 Suppression of river ice by thermal effluents. Ashton, G.D.,	B.M., et al, [1985, p.1424-1429] MP 2090 Techniques for measurement of snow and ice on freshwater.	(1980, p.101-128) MP 135 Environmental engineering, Yukon River-Prudhoe Bay Hay
[1979, 23p.] CR 79-30 Maximum thickness and subsequent decay of lake, river and	Adams, W.P., et al, [1986, p.174-222] MP 2000 Upper Delaware River ice control—a case study. Zufelt,	Road. Brown, J., ed, [1980, 187p.] CR 88-1 Field cooling rates of asphalt concrete overlays at low temper
fast sea ice in Canada and Alaska. Bilello, M.A., (1980, 160p.)	J.E., et al, [1986, p.760-770] MP 2005 Hydrologic aspects of ice jams. Calkins, D.J., [1986, p.603-	atures. Eaton, R.A., et al. [1980, 11p.] CR 86-3 Guidebook to permafrost and its features, northern Alask
Sediment displacement in the Ottauquechee River-1975-	609 ₃ MP 2116	Brown, J., ed, [1983, 230p.] MP 164
1978. Martinson, C.R., [1980, 14p.] SR 80-20 Freshwater ice growth, motion, and decay. Ashton, G.D.,	St. Lawrence River freeze-up forecast. Foltyn, B.P., et al., (1986, p.467-481) MP 2120	Rock drilling Kinematics of continuous belt machines. Mellor, M
(1980, p.261-304) MP 1299 Single and double reaction beam load cells for measuring ice	Design and model testing of a river ice prow. Tatinclaux, J.C., [1986, p.137-150] MP 2132	(1976, 24p.) CR 76-1 Kinematics of axial rotation machines. Mellor, M., (1976,
forces. Johnson, P.R., et al, [1980, 17p.] CR 80-25 Clearing ice-clogged shipping channels. Vance, G.P.,	Rivers Debris of the Chena River. McFadden, T., et al, [1976,	45p. ₁ CR 76-1 Transverse rotation machines for cutting and boring in permitting the Mailer M. 1977, 26p. 271
-1090 12-	140	See Maller M 1077 26-

m + 4.00		- • ·
Reck drilling (cont.) Design for cutting machines in permafrost. Mellor, M.,	Infrared inspection of new roofs. Korhonen, C., [1982, 14p.] SE 82-33	Selecty Foundations on permafrost, US and USSR design and prac-
[1978, 24p.] CR 78-11	Analysis of roof snow load case studies; uniform loads. O'-	tice. Fish, A.M., [1983, p.3-24] MP 1682
Mechanics of cutting and boring in permafrost. Mellor, M., (1980, 82p.) CR 86-21	Rourke, M., et al. [1983, 29p.] CR 83-61 Roof moisture surveys: current state of the technology.	Scint Lawrence River St. Lawrence River freeze-up forecast. Foltyn, E.P., et al,
Mechanics of cutting and boring in permafrost. Mellor, M.,	Tobiasson, W., [1983, p.24-31] MP 1628	[1986, p.467-481] MP 2120
(1981, 38p.) CR 81-26 Reck excevation	Ground snow loads for structural design. Ellingwood, B., et al, [1983, p.950-964] MP 1734	Seltne sells NMR phase composition measurements on moist soils.
Excavating rock, ice, and frozen ground by electromagnetic	Blisters in built-up roofs due to cold weather. Korhonen, C.,	Tice, A.R., et al, [1978, p.11-14] MP 1210
radiation. Hoekstra, P., [1976, 17p.] CR 76-36 Dynamics and energetics of parallel motion tools for cutting	et al, [1983, 12p.] SR 83-21 Can wet roof insulation be dried out. Tobiasson, W., et al,	Improving electric grounding in frozen materials. Delaney, A.J., et al, [1982, 12p.] SR 82-13
and boring. Mellor, M., [1977, 85p.] CR 77-87	[1983, p.626-639] MP 1509	Prost heave of saline soils. Chamberlain, E.J., (1983, p.121-
Design for cutting machines in permafrost. Mellor, M., [1978, 24p.] CR 78-11	Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] SR 83-22	126 ₃ MP 1655
Rock mechanics	Locating wet cellular plastic insulation in recently construct-	Effects of salt on unfrozen water content in silt, Lanzhou, China. Tice, A.R., et al, [1984, 18p.] CR 84-16
Block motion from detonations of buried near-surface explosive arrays. Blouin, S.E., [1980, 62p.] CR 86-26	ed roofs. Korhonen, C., et al, [1983, p.168-173] MIP 1729	Shear strength in the zone of freezing in saline soils. Chamberlain EV 1985 a 566 574
Prediction of explosively driven relative displacements in	Comparison of serial to on-the-roof infrared moisture surveys.	berlain, E.J., (1985, p.566-574) MP 1879 Effects of soluble salts on the unfrozen water content in silt.
rocks. Blouin, S.E., [1981, 23p.] CR \$1-11 Alaska Good Friday earthquake of 1964. Swinzow, G.K.,	Korhonen, C., et al, [1983, p.95-105] MP 1709 U.S. Air Force roof condition index survey: Pt. Greely, Alas-	Tice, A.R., et al, [1985, p.99-109] MP 1933
[1982, 26p.] CR 82-01	ka. Coutermarsh, B.A., [1984, 67p.] SR 84-03	Salinity Variations in sea ice. Cox, G.F.N., et al, [1974,
Some recent developments in vibrating wire rock mechanics instrumentation. Dutta, P.K., [1985, 12p.] MP 1968	Probability models for annual extreme water-equivalent ground snow. Ellingwood, B., et al, [1984, p.1153-1159]	p.109-122 ₁ MP 1023
Rocks	MP 1823	Geochemistry of subsea permafrost at Prudhoe Bay, Alaska. Page, F.W., et al, [1978, 70p.] SR 78-14
Mechanisms of crack growth in quartz. Martin, R.J., III, et al, [1975, p.4837-4844] MP \$55	Wetting tests of polystyrene and urethane roof insulations. Tobiasson, W., et al, [1984, 9p. + figs.] MIP 2011	Sintering and compaction of snow containing liquid water.
Resistance of elastic rock to the propagation of tensile cracks.	Roof moisture surveys: yesterday, today and tomorrow.	Colbeck, S.C., et al, [1979, p.13-32] MIP 1190 Compaction of wet snow on highways. Colbeck, S.C.,
Peck, L., et al, [1985, p.7827-7836] MP 2052 Reeds	Tobiasson, W., et al, [1985, p.438-443 + figs.]	(1979, p.14-17) MP 1234
Snow load design criteria for the United States. Tobiasson,	Condensation control in low-slope roofs. Tobiasson, W.,	Mass-balance aspects of Weddell Sea pack-ice. Ackley, S.F., [1979, p.391-405] MP 1286
W., et al., 1976, p.70-72 ₁ MP 947 Protected membrane roofs in cold regions. Aamot, H.W.C.,	(1985, p.47-59) MP 2039 Aerial roof moisture surveys. Tobiasson, W., (1985, p.424-	Physical oceanography of the sessonal sea ice zone.
et al, [1976, 27p.] CR 76-02	425 ₁ MP 2022	McPhee, M.G., [1980, p.93-132] MIP 1294 Low temperature phase changes in moist, briny clays. And-
Water absorption of insulation in protected membrane roofing	Airborne roof moisture surveys. Tobiasson, W., [1986, p.45-47] MP 2139	erson, D.M., et al. [1980, p.139-144] MP 1330
systems. Schaefer, D., [1976, 15p.] CR 76-38 CRREL roof moisture survey, Pease AFB. Korhonen, C., et	Protected membrane roofing systems. Tobiasson, W.,	Arctic Ocean temperature, salinity and density, March-May 1979. McPhee, M.G., (1981, 20p.) SR 81-05
al, [1977, 10p.] SR 77-02	[1986, p.49-50] MP 2140 Construction engineering community: materials and diagnos-	Mechanical properties of multi-year pressure ridge samples.
Methodology used in generation of snow load case histories. McLaughlin, D., et al, 1977, p.163-174, MP 1143	tics. [1986, 54p.] SR 86-01	Richter-Menge, J.A., [1985, p.244-251] MIP 1936 Salt fee
Observation and analysis of protected membrane roofing sys-	Roof blister valve. Korhonen, C., [1986, p.29-31] MP 2138	Optical properties of salt ice. Lane, J.W., (1975, p.363-
tems. Schaefer, D., et al, (1977, 40p.) CR 77-11 Roof loads resulting from rain-on-snow. Colbeck, S.C.,	Lessons learned from examination of membrane roofs in Alas-	372 ₁ MP 854
(1977, 19p.) CR 77-12	ka. Tobiasaon, W., et al, [1986, p.277-290] MP 2003	Salting Use of de-icing salt—possible environmental impact. Minak,
Installation of loose-laid inverted roof system at Fort Wainwright, Alaska. Schaefer, D., [1977, 27p.] SR 77-18	Rotary drilling	L.D., [1973, p.1-2] MP 1037
Hand-held infrared systems for detecting roof moisture.	General considerations for drill system design. Mellor, M., et al, [1976, p.77-111] MP 856	Noncorrosive methods of ice control. Minsk, L.D., [1979, p.133-162] MP 1265
Tobiasson, W., et al, [1977, p.261-271] MP 1390 Mid-winter installation of protected membrane roofs in Alas-	Kinematics of axial rotation machines. Mellor, M., [1976,	Optimizing deicing chemical application rates. Minsk, L.D.,
ka. Aamot, H.W.C., (1977, 5p.) CR 77-21	45p.; CR 76-16 Rubber ice friction	[1982, 55p.] CR 82-18 Salt action on concrete. Sayward, J.M., [1984, 69p.]
Detection of moisture in construction materials. Morey, R.M., et al. (1977, 9p.)	Driving traction on ice with all-season and mud-and-snow	SR 84-25
R.M., et al, [1977, 9p.] CR 77-25 Infrared detective: thermograms and roof moisture. Kor-	Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27	SR 84-25 Samplers
R.M., et al, [1977, 9p.] CR 77-25 Infrared detective: thermograms and roof moisture. Kor- honen, C., et al, [1977, p.41-44] MP 961	Driving traction on ice with all-season and mud-and-snow	SR 84-25 Semplors CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 82-69
R.M., et al, [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al, [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490]	Driving traction on ice with all-sesson and mud-and-anow radial tires. Blaindell, G.L., [1983, 22p.] CR 83-27 Rubber snow friction Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] MF 1130	SR 84-25 Samplers CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 82-09 Sends
R.M., et al, [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al, [1977, p.41-44] MP 961 Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] MP 962 CRREL roof moisture survey, Building 208 Rock Island Arse-	Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew frictions Shallow snow performance of wheeled vehicles. Harrison,	Semplors CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SER \$2-69 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] MP 1078
R.M., et al., [1977, 9p.] Infirsted detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] SE 77-43 Roof moisture survey: ten State of New Hampshire buildings.	Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew friction Shallow snow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] MP 1130 Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Messurement of snow surfaces and tire performance evalua-	SR 84-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 82-09 Sands Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982,
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of New Hampahire buildings. Tobiasson, W., et al., [1977, 29p.] CR 77-31	Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew friction Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-36 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1516 CRREL instrumented vehicle for cold regions mobility meas-	SR 84-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 82-69 Sanda Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish,
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of, Neu Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structures. O'Rourke, M.J., [1978, p.418-428] MP 1801	Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber sawe frictions Shallow snow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515	SR 84-25 Semplors CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 82-69 Semås Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al, [1984, p.1373-1378] MIP 1810
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] MP 961 Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] MF 962 CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] SR 77-43 Roof moisture survey: ten State of New Hampahire buildings. Tobiasson, W., et al., [1977, 29p.] CR 77-31 Snow loads on structures. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared cam-	Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew friction Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-36 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1516 CRREL instrumented vehicle for cold regions mobility meas-	SR 84-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 82-69 Sanda Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish,
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] R 77-31 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] MP 1801 Detecting wet roof insulation with a hand-held infrared camers. Korhonen, C., et al., [1978, p.A9-A15] MP 1213	Driving traction on ice with all-sesson and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rubber seew friction Shallow snow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1516 CREEL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rasseff	SR 84-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 82-09 Sends Grouting silt and sand at low temperatures. Johnson, R., MP 1078 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] MP 1512 Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sentery engineering Waste management in the north. Rice, E., et al., [1974, p.14-21] MP 1848
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.42-490) CRREL roof moisture survey, Building 208 Rock Island Arnenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structures. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.A9-A15]	Driving traction on ice with all-sesson and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snow friction Shallow anow performance of wheeled vehicles. W.L., [1976, p. 589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al., [1982, 7p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-sesson and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-69 Sanda Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbock, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sanitary oughnoring Waste management in the north. Rice, E., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Roed, S.C., et al., [1980, 127p.]
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Sanow loads on structurea. O'Rourke, M.J., [1978, p.418-428] MP 1301 Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.A9-A15] MP 1213 Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] SR 78-01 Roof construction under wintertime conditions: a case study.	Driving traction on ice with all-aeason and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber saew friction Shallow anow performance of wheeled vehicles. M.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow anow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al., [1982, 7p.] MP 1516 CRRBL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-aeason and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rasoff Snow accumulation for arctic freshwater supplies. Slaughter, C.W., et al., [1975, p.218-224] Biffects of radiation penetration on anowmelt runoff hydro-	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-09 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] Sanitary engineering Waste management in the north. Rice, E., et al., [1974, MP 1842] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] MP 961 Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] MP 962 CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] SR 77-43 Roof moisture survey: ten State of New Hampahire buildings. Tobiasson, W., et al., [1977, 29p.] CR 77-31 Snow loads on structures. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camers. Korhonen, C., et al., [1978, p.49-A15] MP 1213 Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] SR 78-24	Driving traction on ice with all-season and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rubber snew friction Shallow snow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] MP 1130 Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CREEL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rusoff Snow accumulation for arctic freshwater supplies. C.W., et al., [1975, p.218-224] MP 860 Effects of radiation penetration on snowmelt runoff hydrographs. Cobbeck, S.C., [1976, p.73-82] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs.	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-69 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sanitary engineering Waste management in the north. Rice, B., et al., [1974, MP 1421] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.]
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] Roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey; ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Sanow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.A9-A15] MP 1201 Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] SR 78-24	Driving traction on ice with all-sesson and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew friction Shallow snow performance of wheeled vehicles. M.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1982, 17p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 17p.] MP 1515 Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Ransoff Snow accumulation for arctic freshwater supplies. C.W., et al, [1975, p.218-224] Bffects of radiation penetration on snowmelt runoff bydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] CR 76-11	SR 24-25 CRREL 2-inch frazil ice sampier. Rand, J.H., [1982, 8p.] SR 22-09 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] Waste management in the north. Rice, E., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, p.1-12] Nutrient film technique for wastewater treatment.
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Sanow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 3p.] Reof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] SR 78-09	Driving traction on ice with all-season and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rubber snew friction Shallow anow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CREEL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Runoff Snow accumulation for arctic freshwater supplies. C.W. et al., [1975, p.218-224] MP 860 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] CR 76-11 Energy balance and runoff from a subarctic snowpeck.	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-09 Samés Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1512 Samitary sugmeering Waste management in the north. Rice, B., et al., [1974, MP 1848 Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] Nutrient film technique for wastewater treatment. Bouzoun, J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.A9-A15] MP 1201 Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen,	Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rubber snew friction Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow anow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 1p.] MP 1515 Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rusoff Snow accumulation for arctic freshwater supplies. CR, (1975, p.218-224) Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Bricots of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.79-82] Energy balance and runoff from a subarctic crowpacks. Dunne, T., Generation of runoff from subarctic snowpacks. Dunne, T.,	SR 24-25 CRREL 2-inch frazil ice sampier. Rand, J.H., [1982, 8p.] Smås Grouting silt and sand at low temperatures. Johnson, R., [1979, p. 937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] MP 1512 Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] Waste management in the north. Rice, E., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., MP 1422 Nutrient film technique for wastewater treatment. SR 82-84 Corps of Engineers land treatment of wastewater reserved program: an annotated bibliography. Parker, L.V., et al.
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] RREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] R 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Sanow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.49-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 3p.] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 3p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Roof moisture survey.—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refs.] Roof response to icing conditions. Lane, J.W., et al., [1979, 7979]	Driving traction on ice with all-season and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rubber snew friction Shallow anow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CREEL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Runoff Snow accumulation for arctic freshwater supplies. C.W. et al., [1975, p.218-224] MP 860 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] CR 76-11 Energy balance and runoff from a subarctic snowpeck.	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-09 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] Sanitary engineering Waste management in the north. Rice, B., et al., [1974, MP 1848] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] Nutrient film technique for wastewater treatment. Bouzoun, J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskan-
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of New Hampahire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 34p.] SR 78-29 Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refs.] Roof response to icing conditions. Lane, J.W., et al., [1979, 8 79-16] Roof response to icing conditions. Lane, J.W., et al., [1979, 340p.]	Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew frictions Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] MP 1130 Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1981, 12p.] MP 1515 Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rasoff Snow accumulation for arctic freshwater supplies. CR 83-27 Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, 2p.] CR 76-11 Energy balance and runoff from a subarctic Price, A.G., et al, [1976, 29p.] CR 76-11 snowpack. CR 76-27 Generation of runoff from subarctic snowpacks. Dune, T., et al, [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., [479, 432p.] SR 78-36	SR 24-25 CRREL 2-inch frazil ice sampier. Rand, J.H., [1982, 8p.] Smås Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sanitary engineering Waste management in the north. Rice, E., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, p.1-12] Nutrient film technique for wastewater treatment. J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Island development program. Island treatment. Regent S.2.
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] RREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] R 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Sanow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.49-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 3p.] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 3p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Roof moisture survey.—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refs.] Roof response to icing conditions. Lane, J.W., et al., [1979, 7979]	Driving traction on ice with all-sesson and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rubber snew friction Shallow snow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1982, 1p.] MP 1516 CRRBL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1982, 12p.] CR 83-27 Rusself Snow accumulation for arctic freshwater supplies. Slaughter, C.W., et al, [1975, p.218-224] MP 560 Biffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Biffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82, CR 76-11 Bnergy balance and runoff from a subarctic snowpack. Price, A.G., et al, [1976, 29p.] CR 76-27 Generation of runoff from subarctic snowpacks. et al, [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck,	SR 24-25 CRREL 2-inch frazil ice sampier. Rand, J.H., [1982, 8p.] SR 22-09 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] Senitary configuration of the north. Rice, B., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, p.1-12] Nutrient film technique for wastewater treatment. Bouzoun, J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. lakandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984,
R.M., et al., [1977, 9p.] Infirsted detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arnenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structures. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infirated camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey.—U.S. Military Academy. Korhonen, C., et al., [1979, 8 reft.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] CR 79-17 Roof moisture survey. Korhonen, C., et al., [1980, 31p.] Roof leaks in cold resions: school at Chevak. Alaska.	Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] Rubber snew friction Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1981, 12p.] MP 1515 Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] Rusoff Snow accumulation for arctic freshwater supplies. C.W., et al, [1975, p.218-224] Biffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, pp.] Energy balance and runoff from a subarctic price, A.G., et al, [1976, 29p.] Generation of runoff from mubarctic snowpacks. Dune, T., et al, [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al, [1976, 432p.] Snow accumulation, distribution, melt, and runoff. Colbeck, S.C., et al, [1979, p.465-468] Watershed modeling in cold regions. Stokely, J.L., [1980,	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-69 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p. 937-950] MP 1676 Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] MP 1512 Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sentiary engineering Waste management in the north. Rice, E., et al., [1974, p.14-21] Aqusculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] Aqusculture systems for wastewater treatment. Reed, S.C., MP 1422 Aqusculture systems for wastewater treatment. J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p.] CR 23-26 Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] SR 84-68
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] Roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Sanow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.A9-A15] MP 1201 Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Rodfledd, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refs.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] Roof in cold regions: Marson's Store. Claremont. New	Driving traction on ice with all-season and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew friction Shallow snow performance of wheeled vehicles. M.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1982, 11p.] MP 1515 Snow accumulation for arctic freshwater supplies. C.W., et al, [1975, p.218-224] Snow accumulation for arctic freshwater supplies. C.W., et al, [1975, p.218-224] Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82) MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82) MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82) CR 76-27 Generation of runoff from subarctic snowpacks. et al, [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. S.C., et al, [1979, 9.465-468] MP 1233 Snow secumulation, distribution, melt, and runoff. Colbeck, S.C., et al, [1979, 9.465-468]	SR 24-25 CRREL 2-inch frazil ice sampier. Rand, J.H., [1982, 8p.] SR 22-09 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] Sanitary caginacuring Waste management in the north. Rice, E., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., MP 1422 Nutrient film technique for wastewater treatment. Bouzoun, J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] CR 83-19
R.M., et al., [1977, 9p.] Infirsted detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.) SE 77-43 Roof moisture survey; ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infirated camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refs.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al, [1980, 13p.]	Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew frictions Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] MP 1310 Predicting wheeled vehicle motion resistance in shallow anow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al., [1982, 7p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Ranoff Snow accumulation for arctic freshwater supplies. CR, et al., [1975, p.218-224] CR 83-27 Ranoff or radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, 9p.] CR 83-27 MP 948 Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, 9p.] CR 76-11 Energy balance and runoff from subarctic snowpack. CR 76-11 Energy balance and runoff from subarctic snowpack. CR 76-27 Generation of runoff from subarctic snowpacks. CR 76-27 Snow accumulation, distribution, melt, and runoff. Colbeck, S.C., et al., [1979, p.465-468] Snow accumulation, distribution, melt, and runoff. Colbeck, S.C., [1981, p.1-10] MP 1471 Atmospheric pollutants in snow cover runoff. Colbeck, Cl. [1981, p.1-10] MP 1586	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-69 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p. 937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p. 116-123] MP 1812 Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p. 1373-1378] MP 1819 Senitary engineering Waste management in the north. Rice, E., et al., [1974, p. 14-21] Aquasculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] Aquasculture systems for wastewater treatment. Reed, S.C., MP 1422 Aquasculture systems for wastewater treatment. Reed, S.C., ot al., [1980, p.1-12] Nutrient film technique for wastewater treatment. J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskander, L.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Staturation
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] Roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Sanow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.A9-A15] MP 1201 Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 5p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refs.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al., [1980, 13p.] SR 80-18 New 2 and 3 inch diameter CRREL snow samplers. Bates,	Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew friction Shallow anow performance of wheeled vehicles. M.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow anow. Blaisdell, G.L., [1981, 18p.] Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1982, 17p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] Ranoff Snow accumulation for arctic freshwater supplies. C.W., et al, [1975, p.218-224] Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 949 Berry balance and runoff from a subarctic price, A.G., et al, [1976, 29p.] Ceneration of runoff from subarctic snowpacks. CR 76-27 Generation of runoff from subarctic snowpacks. S.C., ed, [1979, 432p.] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al, [1979, p.465-468] MP 1233 Watershed modeling in cold regions. Stokely, J.L., [1980, 241p.] Atmospheric pollutants in snow cover runoff. Colbeck, S.C., All p.1741 Atmospheric pollutants in snow cover runoff. Colbeck, S.C.,	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-69 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sanitary engineering Waste management in the north. Rice, E., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. lakandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of aludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Schneiter Schneiter, R.W., et al., [1984, 140p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Schneiter Schneiter, R.W., et al., [1984, 140p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Schneiter Schneiter, R.W., et al., [1984, 140p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Schneiter Schneiter Remover.
R.M., et al., [1977, 9p.] Infirsted detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.) SE 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infirated camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 27p.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] New 2 and 3 inch diameter CRREL snow samplers. Bates, R.E., et al., [1980, p.199-200) MP 1430	Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber snew frictions Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] MP 1130 Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al., [1982, 7p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-sesson and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Ranoff Snow accumulation for arctic freshwater supplies. CR, et al., [1975, p.218-224] CR 83-27 Ranoff Snow accumulation for arctic freshwater supplies. CR 76-27 MP 948 Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, 9p.] CR 83-27 MP 948 Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, 9p.] CR 76-11 Energy balance and runoff from subarctic snowpacks. Price, A.G., et al., [1976, 29p.] CR 76-27 MP 948 Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al., [1976, p.465-468] Matershed modeling in cold regions. Stokely, J.L., [1980, 241p.] MP 1231 Atmospheric pollutants in snow cover runoff. Colbeck, S.C., [1981, p.1-10] MP 1366 Atmospheric pollutants in snow cover runoff. Colbeck, S.C., [1981, p.1383-1388] Coverland flow: an alternative for wastewater treatment.	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-09 Sands Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] MP 1512 Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] Waste management in the north. Rice, E., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] MP 1423 Aquaculture systems for wastewater treatment. Bouzoun, J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Schuration Difficulties of measuring, the water saturation and porosity of snow. Colbock, S.C., [1978, p.189-201] MP 1124 Water movement in a land treatment system of wastewater by wastewater by wastewater by seems of wastewater by seems of wastewater by seems of wastewater by seems of wastewater by wastewater by seems of wastewater by seems of wastewater by seems of wastewater by wa
R.M., et al., [1977, 9p.] Infirsted detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.) SE 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infirated camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 27p.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] New 2 and 3 inch diameter CRREL snow samplers. Bates, R.E., et al., [1980, p.199-200) MP 1430	Driving traction on ice with all-aeason and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rabber saew friction Shallow anow performance of wheeled vehicles. M.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow anow. Blaisdell, G.L., [1981, 18p.] Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 1p.] MP 1515 Driving traction on ice with all-aeason and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] Snow accumulation for arctic freshwater supplies. C.W., et al., (1975, p.218-224) Biffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Biffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Energy balance and runoff from a subarctic price, A.G., et al., [1976, 29p.] Generation of runoff from subarctic snowpacks. Dunne, T., et al., [1976, p.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., ed., [1979, 432p.] Snow accumulation, distribution, melt, and runoff. Colbeck, S.C., (1981, p.1-10) Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.1-10) Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.1-1383-1388) MP 1487	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-89 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p. 937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] MP 1512 Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] Waste management in the north. Rice, E., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, p.1-12] Nutrient film technique for wastewater treatment. J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater reserved program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of aludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] SR 84-68 Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Sr 84-68 Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Sr 84-68 Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Sr 84-68 Nitrogen removal in wastewater saturation and porosity of snow. Colbeck, S.C., [1978, p.189-201] MP 1124 Water movement in a land treatment system of wastewater by overland flow. Nakano, Y., et al., [1979, p.185-206]
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.) SR 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structures. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey.—U.S. Military Academy. Korhonen, C., et al., [1979, srf.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof moisture survey. Korhonen, C., et al., [1980, 31p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] CR 89-14 Roof in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al., [1980, 13p.] SR 80-25 New 2 and 3 inch diameter CRREL snow samplers. Bates, R.E., et al., [1980, p.199-200] MP 1436	Driving traction on ice with all-season and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rubber snew friction Shallow anow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CREEL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-snow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Runoff Snow accumulation for arctic freshwater supplies. MP 860 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Generation of runoff from subarctic snowpacks. Price, A.G., et al., [1976, 29p.] CR 76-27 Generation of runoff from subarctic snowpacks. Dunne, T., et al., [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al., [1979, 9432p.] Snow accumulation, distribution, melt, and runoff. Colbeck, S.C., et al., [1979, 9432p.] All plays accumulation distribution, melt, and runoff. Colbeck, S.C., [1981, p.138-1388] Overland flow: an alternative for wastewater treatment. Martel, C.J., et al., [1982, p.181-184] Hydrology and climatology of a drainage basin near Pairbanks, Alaska. Haugen, R.K., et al., [1982, 34p.]	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-09 Sands Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Santtary engineering Waste management in the north. Rice, E., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] Aquaculture systems for wastewater treatment. J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 32p.] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of shudges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Saturation Difficulties of measuring the water saturation and porosity of snow. Colbock, S.C., [1978, p.189-201] MP 1225 Saws
R.M., et al., [1977, 9p.] Infirsted detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.42-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.) SE 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structure. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infirated camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Reof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refs.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al., [1980, 13p.] New 2 and 3 inch diameter CRREL snow samplers. Res., et al., [1980, p.199-200) MP 1430 Moisture gain and its thermal consequence for common roof insulations. Tobiasson, W., et al., [1980, p.4-16) MP 1406	Driving traction on ice with all-season and mud-and-anovar radial tires. Blaisdell, G.L., [1983, 22p.] Rubber snew friction Shallow snow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Mesurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CREEL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] Driving traction on ice with all-season and mud-and-anovar adial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Runoff Snow accumulation for arctic freshwater supplies. C.W., et al., [1975, p.218-224] MP 860 Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 860 Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] CR 76-27 Generation of runoff from subarctic snowpacks. Price, A.G., et al., [1976, 29p.] Generation of runoff from subarctic snowpacks. S.C., ed., [1979, 432p.] Soow accumulation, distribution, melt, and runoff. Colbeck, S.C., [1979, 432p.] Watershed modeling in cold regions. Stokely, J.L., [1980, MP 1233 Watershed modeling in cold regions. Stokely, J.L., [1980, MP 1471 Atmospheric pollutants in snow cover runoff. Colbeck, S.C., [1981, p.138-1388] Overland flow: an alternative for wastewater trament. Martel, C.J., et al., [1982, p.181-184] Hydrology and climatology of a drainage basin near Fairbuthalts, Alaska. Haugen, R.K., et al., [1982, 34p., CR 82-26 Runoff from a small subarctic watershed, Alaska. Chacho.	SR 24-25 CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 22-89 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p. 937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] MP 1512 Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1818 Sanitary engineering Waste management in the north. Rice, E., et al., [1974, p.14-21] MP 14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., MP 1423 Nutrient film technique for wastewater treatment. J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskandar, L.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Signaturation Difficulties of measuring the water saturation and porosity of snow. Colbock, S.C., [1978, p.189-201] MP 1124 Water movement in a land treatment system of wastewater by overland flow. Nakano, Y., et al., [1979, p.185-206] MP 1228 Saws Development of large ice saws. Garfield, D.E., et al., [1976, 14p.] CR 76-47
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.) SR 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.) CR 77-31 Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camers. Korhonen, C., et al., [1978, p.A9-A15] MP 1203 Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 3p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refa.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof moisture survey. Korhonen, C., et al., [1980, 31p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al., [1980, 12p.] CR 80-18 Roofs in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al., [1980, 13p.] MP 1436 Roofs in cold regions. Tobiasson, W., [1980, 21p.] MP 1361 Roofs in cold regions. Tobiasson, W., [1980, 21p.] MP 1362 Venting of built-up roofing systems. Tobiasson, W., [1981, 1981,	Driving traction on ice with all-season and mud-and-anovariadia tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Rubber snew friction Shallow snow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-anovarials tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Ruseff Snow accumulation for arctic freshwater supplies. Slaughter, C.W., et al., [1975, p.218-224] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82, MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82, CR 76-27 Generation of runoff from subarctic snowpacks. et al., [1976, P.677-685, MP 948 Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al., [1979, 432p.] Snow accumulation, distribution, melt, and runoff. Colbeck, S.C., et al., [1979, p.465-468] MP 1233 Watershed modeling in cold regions. Stokely, J.L., [1980, 241p.] MP 1471 Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.1-10) Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.133-1388) Overland flow: an alternative for wastewater the Martel, C.J., et al., [1982, p.181-184] Hydrology and climatology of a drainage basin near Fairbanks, Alaska. Haugen, R.K., et al., [1982, 34p.] CR 82-26 Runoff from a small subarctic watershed, Alaska. Chach, E.F., et al., [1983, p.115-120)	Semplers CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 82-09 Semés Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Pertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sanitary cagineering Waste management in the north. Rice, E., et al., [1974, p.14-21] MP 1948 Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] MP 1422 Corps of Engineers for wastewater treatment. SR 82-09 Lond treatment research and development program. SR 82-09 Land treatment research and development program. lakandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of shudges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Saturation Difficulties of measuring the water saturation and porosity of snow. Colbock, S.C., [1978, p.189-201] MP 1124 Staws Development of large ice saws. Garfield, D.E., et al., [1976, 14p.] CR 76-47 Scandinaria
R.M., et al., [1977, 9p.] Infirsted detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.42-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.). SE 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infirated camers. Korhonen, C., et al., [1978, p.A9-A15] MP 1201 Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, srf.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof moisture survey. Korhonen, C., et al., [1980, 13p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 13p.] New 2 and 3 inch diameter CRREL snow samplers. Bates, R.E., et al., [1980, p.199-200) MP 1436 Roofs in cold regions. Tobiasson, W., [1980, 21p.] MP 1408 Venting of built-up roofing systems. Tobiasson, W., [1981, MP 1498, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1980, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1980, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys.	Driving traction on ice with all-season and mud-and-anovar radial tires. Blaisdell, G.L., [1983, 22p.] Rubber snew friction Shallow snow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Mesurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CREEL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] Driving traction on ice with all-season and mud-and-anovar radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Runoff Snow accumulation for arctic freshwater supplies. C.W., et al., [1975, p.218-224] MP 860 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Generation of runoff from subarctic snowpacks. Price, A.G., et al., [1976, 29p.] Generation of runoff from subarctic snowpacks. Dunne, T., et al., [1976, p.677-685] MOdeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al., [1979, 9432p.] Snow accumulation, distribution, melt, and runoff. Colbeck, S.C., (1981, p.1-10) Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.1-10) Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.1-38-1388) Overland flow: an alternative for wastewater tradment. Martel, C.J., et al., [1982, p.181-184] Hydrology and climatology of a drainage basin near Fairbants, Alaska. Haugen, R.K., et al., [1982, 34p., CR 82-26 Runoff from a small subarctic watershed, Alaska. Chacho, B.F., et al., [1983, p.115-120) MP 1654 Runoff from sextanged water run-off from snow and ice.	Sensplers CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR \$2-09 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Pertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sentiary engineering Waste management in the north. Rice, E., et al., [1974, p.14-21] MP 1842 Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] MP 1423 Nutrient film technique for wastewater treatment. Bouzoun, J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Seturation Difficulties of measuring the water saturation and porosity of snow. Colbeck, S.C., [1978, p.189-201] MP 1225 Saws Development of large ice saws. Garfield, D.E., et al., [1976, 121p.) Scandinavia Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.)
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490] CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.] SR 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Sanow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 3p.] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey.—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refs.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof moisture survey. Korhonen, C., et al., [1980, 31p.] Roofs in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] Roofs in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al., [1980, 12p.] NP 1430 Noisture gain and its thermal consequence for common roof insulations. Tobiasson, W., et al., [1980, p.199, 200] MP 1361 Roofs in cold regions. Tobiasson, W., et al., [1980, 12p.] NP 1408 Venting of built-up roofing systems. Tobiasson, W., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.]	Driving traction on ice with all-season and mud-and-anovaridial tires. Blaisdell, G.L., [1983, 22p.] Rabber snew friction Shallow snow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1982, 11p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 23-27 Ransoff Snow accumulation for arctic freshwater supplies. C.W., et al., [1975, p.218-224] Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] CR 76-11 Baergy balance and runoff from a subarctic snowpack. et al., [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al., [1979, 9.465-468] Modeling snow cover runoff meeting, Sep. 1978. S.C., et al., [1979, p.465-468] Watershed modeling in cold regions. Stokely, J.L., (1980, 241p.) Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.1383-1388) Overland flow: an alternative for wastewater wartel, p. 1383-1388; Overland flow: an alternative for wastewater wartel, L., et al., [1982, 34p., p. 1883-1388] Overland flow: an alternative for wastewater wartel, L., et al., [1982, 34p., p. 1864] Hydrology and climatology of a drainage basin near Fairbanks, Alaska. Haugen, R.K., et al., [1982, 34p., CR 82-26 Runoff form a small subarctic watershed, Alaska. Chacho, F.F., et al., [1983, p.115-120] Runoff forecasting of water run-off from snow and ice. Colbeck, S.C., [1977, p.571-588]	Semplers CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR 82-09 Semés Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] MP 1512 Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Semitary sengineering Waste management in the north. Rice, B., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p-] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, p.1-12] Nutrient film technique for wastewater treatment. J.R., et al., [1982, 15p-] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p-] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p-] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p-] Situration Difficulties of measuring the water saturation and porosity of snow. Colbock, S.C., [1978, p.189-201] Water movement in a land treatment system of wastewater by overland flow. Nakano, Y., et al., [1979, p.185-206] MP 1285 Saws Development of large ice saws. Garfield, D.E., et al., [1976, 14p-] CR 76-47 Scandinaria Utility distribution systems in Sweden, Finland, Norway and Regiand. Aamot, H.W.C., et al., [1976, 121p-)
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490) CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.) SR 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Reof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 879-16 Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof moisture survey. Korhonen, C., et al., [1980, 13p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al., [1980, 12p.] New 2 and 3 inch diameter CRREL snow samplers. Bates, R.B., et al., [1980, p.199-200) MP 1430 Moisture gain and its thermal consequence for common roof insulations. Tobiasson, W., et al., [1980, 21p.] MP 1361 Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] SR \$1-31 Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., [1982, 1631, 166] MP 1362	Driving traction on ice with all-season and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] Rubber snew friction Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] Mesurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Russell Snow accumulation for arctic freshwater supplies. Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Generation of runoff from subarctic snowpacks. Let al, [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al, [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al, [1979, 432p.] MP 1833 Watershed modeling in cold regions. Stokely, J.L., [1980, 241p.] Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.138-1388) Overland flow: an alternative for wastewater transment. Martel, C.J., et al, [1982, p.181-184] Hydrology and climatology of a drainage basin near Fairbanks, Alaska. Haugen, R.K., et al, [1982, 34p.] CR 82-26 Runoff from a small subarctic watershed, Alaska. Chacho, MP 1654 Rusself Sevensting Short-term forecasting of water run-off from snow and ice. Colbeck, S.C., [1977, p.571-588] Use of Landast data for predicting snowmelt runoff in the upper Saint John River basin. Merry, C.J., et al, [1983, 1985]	Sensplers CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR \$2-09 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Pertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sentiary engineering Waste management in the north. Rice, E., et al., [1974, p.14-21] MP 1842 Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Sendering assessment. Reed, S.C., et al., [1980, 127p.] MP 1423 Nutrient film technique for wastewater treatment. Bouzoun, J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Schurstion Difficulties of measuring the water saturation and porosity of snow. Colbeck, S.C., [1978, p.189-201] MP 1124 Water movement in a land treatment system of wastewater by overland flow. Nakano, Y., et al., [1979, p.185-206] MP 1285 Saws Development of large ice saws. Garfield, D.E., et al., [1976, 14p.] Scantinarya Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] Scantinarya Scantinarya Sow-Two/Smoke Week VI field experiment plan. Red-
R.M., et al., [1977, 9p.] R.M., et al., [1977, p.41-44] Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.42-490) CRREL roof moisture survey, Building 208 Rock Island Arnenal. Korhonen, C., et al., [1977, 6p.] SR 77-43 Roof moisture survey: ten State of New Hampahire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structures. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camera. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Roof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 37p.] Roof moisture survey.—U.S. Military Academy. Korhonen, C., et al., [1979, 8 refs.] Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof moisture survey. Korhonen, C., et al., [1980, 31p.] Roof moisture survey. Korhonen, C., et al., [1980, 31p.] Roof in cold regions: School at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al., [1980, 12p.] Roof in cold regions. Tobiasson, W., [1980, 21p.] Roofs in cold regions. Tobiasson, W., [1980, 12p.] Roofs in cold regions. Tobiasson, W., [1980, 12p.] Roofs in cold regions. Tobiasson, W., [1980, 12p.] Roof moisture surveys. Tobiasson, W., [1981, 18p.] Roof moisture surveys. Tobiasson, W., [1982, p.163-166) MP 1496 Venting of built-up roofing systems. Tobiasson, W., [1981, 18p.] Roof moisture detection in roofs with cellular plastic insulation insulation.	Driving traction on ice with all-season and mud-and-anovaridial tires. Blaisdell, G.L., [1983, 22p.] Rabber snew friction Shallow snow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-anow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Ransoff Snow accumulation for arctic freshwater supplies. C.W., et al., [1975, p.218-224] Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82) MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82) MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82) MP 948 Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82) CR 76-27 Generation of runoff from subarctic snowpacks. et al., [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al., [1979, 9.465-468] Watershed modeling in cold regions. Stokely, J.L., [1980, 241p.] Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.1-10) Atmospheric pollutants in snow cover runoff. Colbeck, S.C., [1981, p.1-184] Hydrology and climatology of a drainage basin near Fairbanks, Alaska. Haugen, R.K., et al., [1982, 34p., CR 82-26 Runoff from a small subarctic watershed, Alaska. Chacho, E.F., et al., [1983, p.115-120] Runoff forecasting Short-term forecasting of water run-off from snow and ice. Colbeck, S.C., [1977, p.571-588] MP 1694 Use of Landast data for predicting snowmelt runoff in the upper Saint John River basin. Merry, C.J.,	Semplers CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR \$2-09 Semés Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] MP 1512 Tertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Semitary sengineering Waste management in the north. Rice, B., et al., [1974, p.14-21] Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, p.1-12] Nutrient film technique for wastewater treatment. J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Sitterestica Difficulties of measuring the water saturation and porosity of snow. Colbeck, S.C., [1978, p.189-201] Water movement in a land treatment system of wastewater by overland flow. Nakano, Y., et al., [1979, p.185-206] MP 1228 Saws Development of large ice saws. Garfield, D.E., et al., [1976, 14p.] Scandinavia Utility distribution systems in Sweden, Finland, Norway and Regland. Aamot, H.W.C., et al., [1976, 121p.] Scandinavia Sandinavia
R.M., et al., [1977, 9p.] Infrared detective: thermograms and roof moisture. Korhonen, C., et al., [1977, p.41-44) Roof loads resulting from rain on snow. Colbeck, S.C., [1977, p.482-490) CRREL roof moisture survey, Building 208 Rock Island Arsenal. Korhonen, C., et al., [1977, 6p.) SR 77-43 Roof moisture survey: ten State of New Hampshire buildings. Tobiasson, W., et al., [1977, 29p.] Snow loads on structurea. O'Rourke, M.J., [1978, p.418-428] Detecting wet roof insulation with a hand-held infrared camers. Korhonen, C., et al., [1978, p.A9-A15] Recommendations for implementing roof moisture surveys in the U.S. Army. [1978, 8p.] Reof construction under wintertime conditions: a case study. Bennett, F.L., [1978, 34p.] Research on roof moisture detection. Tobiasson, W., et al., [1978, 6p.] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] Roof moisture survey—U.S. Military Academy. Korhonen, C., et al., [1979, 879-16 Roof response to icing conditions. Lane, J.W., et al., [1979, 40p.] Roof moisture survey. Korhonen, C., et al., [1980, 13p.] Roof leaks in cold regions: school at Chevak, Alaska. Tobiasson, W., et al., [1980, 12p.] Roof in cold regions: Marson's Store, Claremont, New Hampshire. Tobiasson, W., et al., [1980, 12p.] New 2 and 3 inch diameter CRREL snow samplers. Bates, R.B., et al., [1980, p.199-200) MP 1430 Moisture gain and its thermal consequence for common roof insulations. Tobiasson, W., et al., [1980, 21p.] MP 1361 Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] SR \$1-31 Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.] Roof moisture surveys. Tobiasson, W., [1982, 1631, 166] MP 1362	Driving traction on ice with all-season and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] Rubber snew friction Shallow anow performance of wheeled vehicles. W.L., [1976, p.589-614] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] Mesurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., [1981, 18p.] MP 1516 CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515 Driving traction on ice with all-season and mud-and-enow radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Russell Snow accumulation for arctic freshwater supplies. Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] Generation of runoff from subarctic snowpacks. Let al, [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al, [1976, P.677-685] Modeling snow cover runoff meeting, Sep. 1978. Colbeck, S.C., et al, [1979, 432p.] MP 1833 Watershed modeling in cold regions. Stokely, J.L., [1980, 241p.] Atmospheric pollutants in snow cover runoff. Colbeck, S.C., (1981, p.138-1388) Overland flow: an alternative for wastewater transment. Martel, C.J., et al, [1982, p.181-184] Hydrology and climatology of a drainage basin near Fairbanks, Alaska. Haugen, R.K., et al, [1982, 34p.] CR 82-26 Runoff from a small subarctic watershed, Alaska. Chacho, MP 1654 Rusself Sevensting Short-term forecasting of water run-off from snow and ice. Colbeck, S.C., [1977, p.571-588] Use of Landast data for predicting snowmelt runoff in the upper Saint John River basin. Merry, C.J., et al, [1983, 1985]	Sensplers CRREL 2-inch frazil ice sampler. Rand, J.H., [1982, 8p.] SR \$2-09 Sends Grouting silt and sand at low temperatures. Johnson, R., [1979, p.937-950] Configuration of ice in frozen media. Colbeck, S.C., [1982, p.116-123] Pertiary creep model for frozen sands (discussion). Fish, A.M., et al., [1984, p.1373-1378] MP 1810 Sentiary engineering Waste management in the north. Rice, E., et al., [1974, p.14-21] MP 1842 Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Reed, S.C., et al., [1980, 127p.] MP 1422 Aquaculture systems for wastewater treatment. Sendering assessment. Reed, S.C., et al., [1980, 127p.] MP 1423 Nutrient film technique for wastewater treatment. Bouzoun, J.R., et al., [1982, 15p.] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al., [1983, 82p.] Land treatment research and development program. Iskandar, I.K., et al., [1983, 144p.] Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984, 40p.] Nitrogen removal in wastewater ponds. Reed, S.C., [1984, 26p.] Schurstion Difficulties of measuring the water saturation and porosity of snow. Colbeck, S.C., [1978, p.189-201] MP 1124 Water movement in a land treatment system of wastewater by overland flow. Nakano, Y., et al., [1979, p.185-206] MP 1285 Saws Development of large ice saws. Garfield, D.E., et al., [1976, 14p.] Scantinarya Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] Scantinarya Scantinarya Sow-Two/Smoke Week VI field experiment plan. Red-

Conductivity and surface impedance of sea ice. McNeill, D.,	
et al, (1971, 19p. plus diagrams) MP 1071	P
los forces on vertical piles. Nevel, D.E., et al, (1972, p.104- 114) MP 1024	S:
Mesoscale deformation of sea ice from satellite imagery. Anderson, D.M., et al. (1973, 2p.) MP 1120 Classification and variation of sea ice ridging in the Arctic	Ic Se
basin. Hibler, W.D., III, et al., [1974, p.127-146] MP 1022	D
Salinity variations in sea ice. Cox, G.F.N., et al, 1974, p.109-122 ₁ MP 1023	S
BRTS mapping of Arctic and subarctic environments. Anderson, D.M., et al, [1974, 128p.] MP 1047	R
Results of the US contribution to the Joint US/USSR Bering Sea Experiment. Campbell, W.J., et al. (1974, 197p.) MP 1032	D
Remote sensing program required for the AIDJEX model. Weeks, W.F., et al, [1974, p.22-44] MP 1646	Si
Statistical variations in Arctic sea ice ridging and deformation rates. Hibler, W.D., III, [1975, p.J1-J16] MP 850	D
Remote sensing plan for the AIDJEX main experiment. Weeks, W.F., et al, [1975, p.21-48] MP 862	Sı
Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] Identify of promoded ice. Kovaca, A. et al. (1975, p.213.)	Se
Islands of grounded ice. Kovacs, A., et al, (1975, p.213-216) MP 852 Third International Symposium on Ice Problems, 1975.	T
Frankenstein, G.E., ed, [1975, 627p.] MP 845 Remote measurement of sea ice drift. Hibler, W.D., III, et	B
Height variation along sea ice pressure ridges. Hibler, W.D.,	lc
III, et al, [1975, p.191-199] MP 848 Arctic environment and the Arctic surface effect vehicle. Sterrett, K.F., [1976, 28p.] CR 76-01	M
Sea ice engineering. Assur, A., (1976, p.231-234) MP 986	A
Sea ice drift and deformation from LANDSAT imagery. Hi-	C R
bler, W.D., III, et al, [1976, p.115-135] MP 1039 Islands of grounded ses ice. Kovacs, A., et al, [1976, 24p.] CR 76-04	D
Thickness and roughness variations of arctic multiyear sea ice. Ackley, S.F., et al, [1976, 25p.] CR 76-18	A
Techniques for studying sea ice drift and deformation at sites far from land using LANDSAT imagery. Hibler, W.D., III, et al., [1976, p.395-609] MP 866	0
Grounded ice along the Alaskan Beaufort Sea coast. Kovacs, A., [1976, 21p.]	D
Grounded floebergs near Prudhoe Bay, Alaska. Kovaca, A., et al, [1976, 10p.] CR 76-34	M
Some characteristics of grounded floebergs near Prudhoe Bay, Alaska. Kovacs, A., et al, [1976, p.169-172]	c
MP 1118 Miagivings on isostatic imbalance as a mechanism for sea ice cracking. Ackley, S.F., et al, [1976, p.85-94]	
	D
MCP 1379	D Si
MP 1379 Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al. (1976, p.33-76) MP 1378 Operational report: 1976 USACRREL-USGS subsea perma-	Si
MP 1379 Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al, (1976, p.53-76) MP 1378 Operational report: 1976 USACRREL-USGS subsea perma- frost program Beaufort Sea, Alaska. Sellmann, P.V., et al, (1976, 20p.) SR 76-12	Si
Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 Operational report: 1976 USACRREL-USGS subsea perma- frost program Beaufort Sea, Alaska. (1976, 20p.) Dynamics of near-ahore ice. Weeks, W.F., et al, 1976, p.267-2751 MP 922	Si
MP 1379 Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al., [1976, p.53-76] MP 1378 MP 1378 Operational report: 1976 USACRREL-USGS subsea permarkost program Beaufort Sea, Alaska. [1976, 20p.] Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.267-275] Sa ice properties and geometry. Weeks, W.F., [1976,	Si Pi N Ir
MP 1379 Antarctic asa ice dynamics and its possible climatic effects. Ackley, S.F., et al., [1976, p.53-76] MP 1378 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al., [1976, 20p.] Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.267-275] Sea ice properties and geometry. Weeks, W.F., 1976, p.137-171] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al., [1977, p.234-237]	Si Pi N In
MP 1379 Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al., [1976, p.53-76] MP 1378 Operational report: 1976 USACRREL-USGS subsea permarkost program Beaufort Sea, Alaska. Sellmann, P.V., et al., [1976, 20p.] Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.267-275] Sea ice properties and geometry. Weeks, W.F., [1976, p.137-171] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al., [1977, p.234-237] Dynamics of near-shore ice. Kovacs, A., et al., [1977, MP 927	Si Pi N In
Antarctic age ice dynamics and its possible climatic effects. Ackley, S.F., et al., [1976, p.53-76] MP 1378 Operational report: 1976 USACRREL-USGS subsea permarkost program Beaufort Sea, Alaska. Sellmann, P.V., et al., [1976, 20p.] Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.267-275] MP 922 Sea ice properties and geometry. Weeks, W.F., [1976, p.137-171] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al., [1977, p.234-237] Dynamics of near-shore ice. Kovacs, A., et al., [1977]	Si Pi N In
MP 1378 Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al., [1976, p.53-76] MP 1378 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al., [1976, 20p.] SR 76-12 Dynamics of near-shore ice. Weeks, W.F., et al., [1976, p.267-275] MP 912 Sea ice properties and geometry. Weeks, W.F., [1976, p.137-171] Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al., [1977, p.234-237] Dynamics of near-shore ice. Kovacs, A., et al., [1977, p.106-112] Seasonal variations in apparent sea ice viscosity on the geophysical scale. Hibler, W.D., III, et al., [1977, p.87-90] MP 900 Dynamics of near-shore ice. Kovacs, A., et al., [1977, p.115-165] MP 1073	SIPPIN NIE
Antarctic aga ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 Operational report: 1976 USACRREL-USGS subsea permarkost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, 20p.; SR 76-12 Dynamics of near-shore ice. Weeks, W.F., et al, 1976, p.267-275; MP 922 Sea ice properties and geometry. Weeks, W.F., t1976, p.137-171; Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-237; Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.106-112; Seasonal variations in apparent sea ice viscosity on the geophysical scale. Hibler, W.D., III, et al, 1977, p.87-90 Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.151-163; Sea ice thickness profiling and under-ice oil entrapment. Kovacs, A., 1977, p.347-550; MP 940	Si Pr N Is Pr M
Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, 20p., 267-2751 Dynamics of near-ahore ice. Weeks, W.F., et al, 1976, p.267-2752 Sea ice properties and geometry. Weeks, W.F., t1976, p.137-1711 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-237 Dynamics of near-ahore ice. Kovacs, A., et al, 1977, p.106-112, MP 928 Seasonal variations in apparent sea ice viscosity on the geophysical scale. Hibler, W.D., III, et al, 1977, p.87-90, MP 900 Dynamics of near-ahore ice. Kovacs, A., et al, 1977, p.151-163, Sea ice thickness profiling and under-ice oil entrapment. Kovacs, A., 1977, p.547-550, MP 940 Visual observations of floating ice from Skylab. Campbell, MP 1243	Si Pi N In Pi M
Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 MP 1378 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, 20p., SR 76-12 Dynamics of near-shore ice. Weeks, W.F., et al, 1976, p.267-2751 MP 922 Sea ice properties and geometry. Weeks, W.F., 1976, p.137-171; MP 918 Delinestion and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-2371 MP 927 Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.106-1123 MP 924 Seasonal variations in apparent sea ice viscosity on the geo-physical scale. Hibler, W.D., III, et al, 1977, p.87-90, MP 900 Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.151-163] MP 1073 Sea ice thickness profiling and under-ice oil entrapment. Kovacs, A., [1977, p.547-550] MP 940 Visual observations of floating ice from Skylab. Campbell, W.J., et al, [1977, p.353-379] MP 1263 Ice strching and the drift of pack ice through restricted channels. Sodki, D.S., [1977, 11p.] CR 77-18	Si Pri N In
Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, 20p. Dynamics of near-ahore ice. Weeks, W.F., et al, 1976, p.267-2751 Sea ice properties and geometry. Weeks, W.F., et al, 1976, p.137-171; Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-237; Dynamics of near-ahore ice. Kovacs, A., et al, 1977, p.106-112; Passonal variations in apparent sea ice viscosity on the geophysical scale. Hibler, W.D., III, et al, 1977, p.87-90, MP 900 Dynamics of near-ahore ice. Kovacs, A., et al, 1977, p.151-163; Sea ice thickness profiling and under-ice oil entrapment. Kovacs, A., (1977, p.547-550; MP 940 Visual observations of floating ice from Skylab. Campbell, W.J., et al, 1977, p.353-379; MP 940 Visual observations of floating ice from Skylab. Campbell, W.J., et al, 1977, p.353-379; MP 91263 Ice arching and the drift of pack ice through restricted channels. Sodhi, D.S., (1977, 11p.) Brazil tensile strength tests on sea ice: a data report. Kovacs, A., et al, 1977, 39p.; Viscous wind-driven circulation of Arctic sea ice. Hibler, Viscous wind-driven circulation of Arctic sea ice. Hibler, Viscous wind-driven circulation of Arctic sea ice.	Si Pi N In Pi M
Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al., 1976, p.53-76, MP 1378 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al., 1976, 20p., SR 76-12 Dynamics of near-shore ice. Weeks, W.F., et al., 1976, p.267-275, MP 922 Sea ice properties and geometry. Weeks, W.F., et al., 1976, p.137-171; MP 918 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al., 1977, p.234-237; MP 927 Dynamics of near-shore ice. Kovacs, A., et al., 1977, p.106-112, MP 928 Seasonal variations in apparent sea ice viscosity on the geo-physical scale. Hibler, W.D., III, et al., 1977, p.151-163, MP 900 Dynamics of near-shore ice. Kovacs, A., et al., 1977, p.151-163, MP 900 Dynamics of near-shore ice. Kovacs, A., et al., 1977, p.151-163, MP 900 Usual observations of floating ice from Skylab. Campbell, W.J., et al., 1977, p.547-550, MP 940 Visual observations of floating ice from Skylab. Campbell, W.J., et al., 1977, p.353-379, CR 77-18 Brazil tensile strength tests on sea ice: a data report. Kovacs, A., et al., 1977, 39p.; 1977, 11p.; Brazil tensile strength tests on sea ice: a data report. Kovacs, A., et al., 1977, 9p.9-133, Pinite element formulation of a sea ice drift model. Sodhi, D.S., 1977, 119; Prize element formulation of a sea ice drift model. Sodhi	Si Si Pi Ni Ni Iri Pi Pi Mi Ni Ci Si
Antarctic aga ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 Operational report: 1976 USACRREL-USGS subsea permarkent program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, 20p.; SR 76-12 Dynamics of near-shore ice. Weeks, W.F., et al, 1976, p.267-275; Sa ice properties and geometry. Weeks, W.F., t1976, p.137-171; Delineation and engineering characteristics of permarkout beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-237; Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.106-112; Seasonal variations in apparent sea ice viscosity on the geophysical scale. Hibler, W.D., III, et al, 1977, p.87-90, MP 900 Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.151-163; Sea ice thickness profiling and under-ice oil entropy. MP 940 Visual observations of floating ice from Skylab. Campbell, W.J., et al, 1977, p.353-379; MP 1073 Sea ice srching and the drift of pack ice through restricted channels. Sodki, D.S., (1977, 11p.; Brail tensile strength tests on sea ice: a data report. Kovacs, A., et al, 1977, 39p.; Viscous wind-driven circulation of Arctic sea ice. Hibler, W.D., III, et al, 1977, 39p.; Viscous wind-driven circulation of Arctic sea ice. Hibler, W.D., et al, [1977, 567-76] Nershore lee meets formulation of a sea ice drift model. Sodki, D.S., et al, [1977, p.57-76] Nershore lee meets formulation ear Prudhoe Bay, Alaska. Tucker, Nearshore lee motion near Prudhoe Bay, Alaska.	SI PP N I I I I I I I I I I I I I I I I I
Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, p.267-2751 Dynamics of near-ahore ice. Weeks, W.F., et al, 1976, p.267-2752 Sea ice properties and geometry. Weeks, W.F., 1976, p.137-1711 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-2371 Dynamics of near-ahore ice. Kovacs, A., et al, 1977, p.106-112 Seasonal variations in apparent sea ice viscosity on the geophysical scale. Hibler, W.D., III, et al, 1977, p.151-163 Sea ice thickness profiling and under-ice oil entrapment. Kovacs, A., [1977, p.547-550] WJ., et al, [1977, p.353-379] MP 1073 Brail tensile strength tests on sea ice: a data report. Kovacs, A., et al, 1977, 399.9 Viscous wind-driven circulation of Arctic sea ice. Hibler, W.D., III, et al, 1977, p.790-118 Brail tensile strength tests on sea ice: a data report. Kovacs, A., et al, 1977, 399.9 Viscous wind-driven circulation of Arctic sea ice. Hibler, W.D., III, et al, 1977, p.57-359 Pinite element formulation of a sea ice drift model. Sodhi, D.S., 1977, p.57-37 MP 1163 Nearshore ice motion near Prudhoe Bay, Alaska. Tucker, W.B., et al, [1977, p.33-317] Decay patterns of land-fast sea ice in Canada and Alaska.	SI PH N I I I I I I I I I I I I I I I I I I
Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al., 1976, p.53-761 MP 1378 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al., 1976, 20p., SR 76-12 Dynamics of near-shore ice. Weeks, W.F., et al., 1976, p.267-2751 MP 922 Sea ice properties and geometry. Weeks, W.F., et al., 1976, p.137-171; MP 918 Delinestion and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al., 1977, p.234-2371 MP 927 Dynamics of near-shore ice. Kovacs, A., et al., 1977, p.106-112, MP 929 Seasonal variations in apparent sea ice viscosity on the geo-physical scale. Hibler, W.D., III, et al., 1977, p.87-90, MP 940 Dynamics of near-shore ice. Kovacs, A., et al., 1977, p.151-163] Sea ice thickness profiling and under-ice oil entrapment. Kovacs, A., [1977, p.547-550] MP 940 Visual observations of floating ice from Skylab. Campbell, W.J., et al., [1977, p.353-379] MP 1263 Ice arching and the drift of pack ice through restricted channels. Sodki, D.S., [1977, 119.] Brazil tensile strength tests on sea ice: a data report. Kovacs, A., et al., [1977, p.95-133] MP 1263 Philte element formulation of a sea ice drift model. Sodhi, D.S., et al., [1977, p.67-76] MP 9165 Nearshore ice motion near Prudhoe Bay, Alaska. Tucker, W.B., et al., [1977, p.23-31] MP 1162 MP 1162 MP 1162	SI SI PPI N I I I I I I I I I I I I I I I I
Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 Operational report: 1976 (USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, p.267-2751 Dynamics of near-ahore ice. Weeks, W.F., et al, 1976, p.267-2752 Sea ice properties and geometry. Weeks, W.F., et al, 1976, p.137-1711 Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-2371 Dynamics of near-ahore ice. Kovacs, A., et al, 1977, p.106-1121 Seasonal variations in apparent sea ice viscosity on the geophysical scale. Hibler, W.D., III, et al, 1977, p.87-90, MP 900 Dynamics of near-ahore ice. Kovacs, A., et al, 1977, p.151-1651 Sea ice thickness profiling and under-ice oil entrapment. Kovacs, A., 1977, p.547-5501 Visual observations of floating ice from Skylab. Campbell, W.J., et al, 1977, p.353-379 Ice arching and the drift of pack ice through restricted channels. Sodhi, D.S., 1977, 11p.1 Brazil tensile strength tests on sea ice: a data report. Kovacs, A., et al, 1977, 39p.; Viscous wind-driven circulation of Arctic sea ice. Hiber, W.D., III, et al, 1977, p.23-31 MP 1163 Nearshore ice motion near Prudhoe Bay, Alaska. Tucker, W.B., et al, 1977, p.23-31 MP 1165 Decay patterns of land-fast sea ice in Canada and Alaska. Bilello, M.A., 1977, p.1-101 MP 1165 Dynamics of near-shore ice. Kovacs, A., et al, 1917, p.411-4241 Model simulation of near shore ice drift, deformation and thickness. Hibler, W.D., III, 1978, p.33-441	PP M N C S S M S S M B E
Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, 20p., Dynamics of near-shore ice. Weeks, W.F., et al, 1976, p.267-2751 Sea ice properties and geometry. Weeks, W.F., et al, 1976, p.137-171; Delineation and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-237; Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.106-112, Seasonal variations in apparent sea ice viscosity on the geo-physical scale. Hibler, W.D., III, et al, 1977, p.87-90, MP 900 Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.151-163, MP 1073 Sea ice thickness profiling and under-ice oil entrapment. Kovacs, A., (1977, p.547-550, MP 940 Visual observations of floating ice from Skylab. MP 1263 Ice arching and the drift of pack ice through restricted channels. Sodhi, D.S., (1977, 11), Brazil tensile strength tests on sea ice: a data report. Kovacs, A., et al, (1977, p.59-133) Finite element formulation of a sea ice drift model. Sodhi, D.S., et al, (1977, p.23-31) MP 1165 Nearshore ice motion near Prudhoe Bay, Alaska. Tucker, W.B., et al, (1977, p.23-31) MP 1165 Decay patterns of land-fast sea ice in Canada and Alaska. Bilello, M.A., (1977, p.1-10) Dynamics of near-shore ice. Kovacs, A., et al, (1977, p.411-424) MP 1010 Radar anisotropy of sea ice. Kovacs, A., et al, (1978, p.71).	Sil Pin No. Co. Sil
Antarctic aea ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 MP 1378 Operational report: 1976 USACRREL-USGS subsea permafrost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, 20p., SR 76-12 Dynamics of near-shore ice. Weeks, W.F., et al, 1976, p.267-2751 MP 922 Sea ice properties and geometry. Weeks, W.F., et al, 1976, p.137-1711 MP 918 Delinestion and engineering characteristics of permafrost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-2371 MP 927 Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.106-112, MP 928 Seasonal variations in apparent sea ice viscosity on the geophysical scale. Hibler, W.D., III, et al, 1977, p.87-90, MP 940 Dynamics of near-shore ice. Kovacs, A., et al, 1977, p.151-163] Sea ice thickness profiling and under-ice oil entrapment. Kovacs, A., [1977, p.547-550] Visual observations of floating ice from Skylab. Campbell, W.J., et al, [1977, p.353-379] MP 1263 Ice strching and the drift of pack ice through restricted channels. Sodki, D.S., [1977, 11p.] Brazil tensile strength tests on sea ice: a data report. Kovacs, A., et al, [1977, p.95-133] MP 1263 Nearshore ice motion near Prudhoe Bay, Alaska. Tucker, W.B., et al, [1977, p.67-76] MP 9165 Nearshore ice motion near Prudhoe Bay, Alaska. Tucker, W.B., et al, (1977, p.3-3-31) MP 1162 Decay patterns of land-fast sea ice in Canada and Alaska. Bibllo, M.A., [1977, p.1-10] MP 1161 Dynamics of near-shore ice. Kovacs, A., et al, [1977, p.411-424] MP 1070 Radar anisotropy of sea ice. Kovacs, A., et al, [1977, p.411-629] Radar anisotropy of sea ice. Kovacs, A., et al, [1977, p.711-201] Radar profile of a multi-year pressure ridge frament.	PP N In
Antarctic aga ice dynamics and its possible climatic effects. Ackley, S.F., et al, 1976, p.53-761 Operational report: 1976 USACRREL-USGS subsea permarkost program Beaufort Sea, Alaska. Sellmann, P.V., et al, 1976, 20p.; SR 76-12 Dynamics of near-ahore ice. Weeks, W.F., et al, 1976, p.267-275; Sa ice properties and geometry. Weeks, W.F., t1976, p.137-171; Delineation and engineering characteristics of permarkost beneath the Beaufort Sea. Sellmann, P.V., et al, 1977, p.234-237; Dynamics of near-ahore ice. Kovacs, A., et al, 1977, p.106-112; Seasonal variations in apparent sea ice viscosity on the geophysical scale. Hibler, W.D., III, et al, 1977, p.87-90, MP 900 Dynamics of near-ahore ice. Kovacs, A., et al, 1977, p.151-163; Sea ice thickness profiling and under-ice oil entertheology. MP 940 Visual observations of floating ice from Skylab. Campbell, W.J., et al, 1977, p.353-379; MP 940 Visual observations of floating ice from Skylab. Campbell, W.J., et al, 1977, 39-35-379; Ise ice thickness profiling and under-ice oil enterties the sea in the sea of the s	SI PH N I I I I I I I I I I I I I I I I I I

```
rimary productivity in sea ice of the Weddell region. Ack-
ley, S.F., et al. [1978, 17p.] CE 78-19
les ice pressure ridges in the Beaufort Ses. Wright, B.D., et al., 1978, p.249-271
al, 1978, p.249-271; los arching and the drift of pack ice through channels. Sodhi, D.S., et al, 1978, p.415-432; MP 1138 Sea ice north of Alaska. Kovacs, A., (1978, p.7-12); MP 1252
      amics of near-shore ice. Kovacs, A., et al, [1978, p.11-
MP 1285
 tes ice and ice algae relationships in the Weddell Sea. Ackley, S.F., et al. (1978, p.70-71) MP 1203
 tadar anisotropy of sea ice. Kovacs, A., et al., r1978, p.6037-6046
 Dynamics of near-shore ice. Kovacs, A., et al. 1978, p.230-2331 MP 1619
 handing crop of algae in the sea ice of the Weddell Sea region.
Ackley, S.F., et al., [1979, p.269-281] MP 1242
hynamic thermodynamic sea ice model. Hibler, W.D., III,
[1979, p.315-346] MP 1247
 urface-based scatterometer results
stott, R.G., et al. [1979, p.78-85]
 stott, R.G., et al, [19/9, p.7s-s-7]
ome results from a linear-viscous model of the Arctic ice
cover. Hibler, W.D., III, et al, [1979, p.293-304]
MP 1241
                   eat flux from Arctic leads. Andress, E.L., et al,
17.41. MP 1346
 [1979, p.57-91]
 huckling analysis of wedge-shaped floating ice sheets. Sod-
hi, D.S., [1979, p.797-810] MP 1232
ce pile-up and ride-up on Arctic and sub
Kovaca, A., et al, [1979, p.127-146]
                                                                               rctic beaches.
MP 1230
 Multi year pressure ridges in the Canadian Ber
Wright, B., et al., [1979, p.107-126]
                                                                                       ufort Sea.
MP 1229
Anisotropic properties of sea ice. Kovaca, A., et al., [1979, p.5749-5759] MP 1258
 rystal alignments in the fast ice of Arctic Alaska. Weeks, W.F., et al., [1979, 21p.] CR 79-22
W.F., et al, [1979, 21p.]
Ross Ice Shelf bottom ice structure. Zotikov, I.A., et al, MP 1336
  [1979, p.65-66]
Orifting buoy measurements on Weddell Sea pack ice. Ackley, S.F., [1979, p.106-108] MP 1339
Anisotropic properties of sea ice in the 50-150 MHz range.

Kovaca, A., et al, [1979, p.324-353]

MP 1620
Kovaca, A., et al, [1979, p.324-335]
Dil pooling under sea ice. Kovaca, A., [1979, p.310-323]
MP 1289
Dynamics of near-shore ice. Kovacs, A., et al., [1979, MP 1291
Dynamics of near-source see. Royacs, A., et al., [19/9, p.181-207]
MP 1291
Maximum thickness and subsequent decay of lake, river and fast see ice in Canada and Alaska. Bilello, M.A., [1980, 160p.]
Crystal alignments in the fast ice of Arctic Alaska. Weeks.
W.F., et al, [1980, p.1137-1146] MP 1277
 Occumentation for a two-level dynamic thermodynamic sea
ice model. Hibler, W.D., III, (1980, 35p.) SR 88-08
Physical oceanography of the seasonal sea
McPhee, M.G., [1980, p.93-132]
 Jumerical modeling of sea ice in the seasonal sea ice zone.
Hibler, W.D., III, 1980, p.299-3561 MP 1296
 htther, w.D., iii, 1200, p.2575501
nternational Workshop on the Seasonal Sea Ice Zone, Mon-
terey, California, Feb. 26-Mar.1, 1979. Andersen, B.G.,
ed. c1980, 357p.1 MF 1292
  ed, (1980, 357p.)
Physical properties of see ice and under-ice current orienta-
tion. Kovaca, A., et al, [1980, p.109-153] MP 1323
Polarization studies in sea ice. Arcone, S.A., et al, [1980, p.225-245] MP 1324
Modeling of anisotropic electromagnetic reflection from sea
ice. Golden, K.M., et al, [1980, p.247-294]
                                                                                       MP 1325
Nonsteady ice drift in the Strait of Belle Isle. Sodhi, D.S., et al, [1980, p.177-186] MP 1364
 et al, [1980, p.177-180]
Continuum sea ice model for a global climate model.
C.H., et al, [1980, p.187-196]
M
                                                                                       lel. Ling,
MP 1622
Sea ice growth, drift, and decay. Hibler, W.D., III, (1980, p.141-209) MP 1298
Dynamics of snow and ice masses. Colbeck, S.C., ed, [1980, 468p.] MP 1297
 ea ice anisotropy, electromagnetic properties and strength.
Kovacs, A., et al, [1980, 18p.] CR 80-20
Modeling of anisotropic electromagnetic reflection from sea
ice. Golden, K.M., et al., [1980, 15p.] CR 80-23
Sea ice studies in the Weddell Sea aboard USCGC Polar Sea.
Ackley, S.F., et al., [1980, p.84-96] MP 1431
Modeling a variable thickness sea ice cover. Hibler, W.D.,
III, [1980, p.1943-1973] MP 1424
Estimation of heat and mass fluxes over Arctic leads. Andreas, E.L., [1980, p.2057-2063] MP 1410
 Choanoflagellates from the Weddell Sea. [1981, p.47-54]
                                                                                 Buck, K.R.,
MP 1453
 (1981, p.47-34)
lea-ice atmosphere interactions in the Weddell Sea using
drifting buoys. Ackley, S.F., (1981, p.177-191)
MP 1427
Hyperbolic reflections on Beaufort Sea seismic records.
Neave, K.G., et al, [1981, 16p.] CR 81-02
Review of thermal properties of snow, ice and see ice. Yen,
Y.-C., [1981, 27p.] CR 81-16
Morphology of sea ice pressure ridge sails. Tucker, W.B., et al, [1981, p.1-12] MP 1465
```

```
Sea ice piling at Fairway Rock, Bering Strait, Alaska.
Kovaca, A., et al, [1981, p.985-1000] MP 1460
 Sea ice rubble formations off the NE Bering Sea at Sound. Kovaca, A., (1981, p.1348-1363)
                                                                                                                 nd Norton
MIP 1527
 Preliminary results of ice modeling in the Basarea. Tucker, W.B., et al. (1981, p.867-878)
                                                                                                                 MP 1458
 Pooling of oil under sea ice. Kovaca, A., et al, [1981, p.912-MP 1459
                 ing of anisotropic electromagnetic reflection
Golden, K.M., et al, (1981, p.8107-8116)
                                                                                                                  MP 1469
 Sea ice: the potential of remote sensing. [1981, p.39-48]
                                                                                                        Weeks, W.F.,
MP 1468
 Distortion of model subsurface radar pulses lectrics. Arcone, S.A., [1981, p.855-864]
                                                                                                ts in complex die-
41 MP 1472
 Ice pile-up and ride-up on arctic and subarctic Kovacs, A., et al, [1981, p.247-273]
                                                                                                                 MP 1538
 Multi-year pressure ridges in the Car
Wright, B., et al, [1981, p.125-145]
                                                                                                               aufort Sea.
MP 1514
Sea ice rubble formations in the Bering Sea an Sound, Alaska. Kovacs, A., [1981, 23p.]
                                                                                                                nd Norton
SR 81-34
 Sound, Alaska. Kovaca, A., [1204], 207].
Radar detection of sea ice and current alinement under the Ross Ice Shelf. Morey, R.M., et al., [1981, p.96-97].
MP 1543
 Physical and structural characteristics of sea ice in McMurdo
Sound. Gow, A.J., et al, [1981, p.94-95] MP 1542
 Orowth, structure, and properties of sea ice. West et al. [1982, 130p.]
 Sea ice drag laws and boundary layer during rap
McPhee, M.G., 1982, 17p.;
Ablation seasons of arctic and antarctic sea ice.
B.L., et al., (1982, p.440-447)
                                               d boundary layer during rapid
B.L., et al., [1982, p.440-447]

Using sea ice to measure vertical heat flux in the ocean.

McPhee, M.G., et al., [1982, p.2071-2074]

MP 1549

On modeling the Weddell Sea pack ice. Hibler, W.D., III, et al., [1982, p.125-130]

Application of a numerical sea ice model to the Bast Greenland area. Tucker, W.B., [1982, 40p.]

Equations for determining the gas and brine volumes in sea ice samples. Cox, G.F.N., et al., [1982, 11p.]

CR 82-36
 Bering Strait sea ice and the Fairway Rock icefoot. Kovacs, A., et al, [1982, 40p.] CR 82-31
On the differences in ablation seasons of Arctic and Anterotic sea ice. Andress, E.L., et al, [1982, 9p.] CR 82-33
Physical properties of the ice cover of the Greenland Sea. Weeks, W.F., [1982, 27p.]
 Weeks, W.F., (1984, 249.)
Atmospheric boundary layer measurements in the Weddell Sea. Andreas, EL., (1982, p.113-115) MP 1610
Physical, chemical and biological properties of winter sea ice in the Weddell Sea. Clarke, D.B., et al., (1982, p.107-104)
 Comment on 'Water drag coefficient of first-year sea ice' by M.P. Langleben. Andreas, E.L., et al, [1983, p.779-782] MP 1577
 Numerical simulation of the Weddell Sea pack ice.
W.D., III, et al., 1983, p.2873-2887;
                                                                                                                e. Hibler,
MP 1592
 W.D., III, et al., [1963, p.2673-2667]

Mar 1972.

Alaska's Beaufort Sea coast ice ride-up and pile-up features.

Kovacs, A., [1983, 51p.]

Surface meteorology US/USSR Weddell Polynya Expedition,
1981. Andreas, E.L., et al., [1983, 32p.]

Properties of sea ice in the coastal zones of the polar cocans.

Weeks, W.F., et al., [1983, p.25-41]

MP 1604
 Comparison of different sea level pressure analysis fields in
the East Greenland Sea. Tucker, W.B., 1983, p.1084-
1088, MP 1737
 1088)
Mechanical behavior of sea ice. Mellor, M., [1983, 105p.]
M 83-1
 Sea ice model in wind forcing fields. Tucker, W.B., 11983, 110.1
 Equations for determining gas and brine volus
Cox, G.F.N., et al. (1983, p.306-316)
                                                                                                        mes in sea ice
MP 2055
 Thermal expansion of saline ice. Cox, G.F.N., [1983, p.425-432] MP 1768
 Surface roughness of Ross Sea pack ice. Govoni, J.W., et al, [1983, p.123-124] MP 1764
 (1703, p.145-149) MP 1744
Mechanical properties of ice in the Arctic sea. Weeks, W.F., et al. (1984, p.235-259) MP 1674
Electromagnetic properties of sea ice. Morey, R.M., et al. (1984, 32p.)
West appreciate of the Arctic CR 84-02
  [1984, 32p.]
West antarctic sea ice. Ackley, S.F., [1984, p.88-95]
MP 1818
                  ology and ecology of diatoms in sea ios
lea. Clarke, D.B., et al, [1984, 41p.]
                                                                                               ice from the Wed-
 Offshore mechanics and Arctic engineering symposium,
1984. [1984, 3 vols.] MP 1675
 Variation of ice strength within and between multi-
sure ridges in the Beaufort Sea. Weeks, W.F.
p.134-139;
                                                                                                           ultiyear pres-
V.F., (1984,
MP 1689
 Sea ice and biological activity in the Antarctic. Clarke, D.B., et al, (1984, p.2087-2095) MP 1701
 Analysis of linear sea ice models with an ice scargin. Lep-
paranta, M., (1984, p.31-36) MP 1782
 Mechanical properties of multi-year sea ice.
niques. Mellor, M., et al, 1984, 39p.<sub>1</sub>
                                                                                                      Testing tech-
CR 84-96
 Bast Greenland Sea ice variability in large-act
lations. Walsh, J.E., et al, [1984, p.9-14]
                                                                                                                odel simu-
MP 1779
 Mechanical properties of multi-year sea icc. Phase 1: Test results. Cox. G.F.N., et al., [1984, 105p.]
Ocean circulation: its effect on seasonal see-icc simulations. Hibler, W.D., III, et al., [1984, p.489-492]
MP 1760
```

Sea ice (coat.)	Review of see-ice weather relationships in the Southern Hem-	Seasonal freeze thaw
Electromagnetic properties of see ice. Morey, R.M., et al.	isphere. Ackley, S.F., [1981, p.127-159] MIP 1426	River ice problems. Burgi, P.H., et al, (1974, p.1-15)
[1984, p.53-75] MP 1776	Air-ice-ocean interaction in Arctic marginal ice zones. Wadhams, P., ed, 1981, 20p.; SR 81-19	MP 1002
Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135]	les distribution and winter surface circulation, Kachemak	Resiliency in cyclically frozen and thawed subgrade soils. Chamberlain, B.J., et al, [1977, p.229-281] MP 1724
MP 1837	Bey, Alaska. Gatto, L.W., [1981, p.995-1001]	Design of airfield pavements for seasonal frost and permafrost
Mechanical properties of see ice: a status report. Weeks,	MP 1442	conditions. Berg, R.L., et al, [1978, 18p.] MP 1189
W.F., et al, [1984, p.135-198] MIP 1808	Summer conditions in the Prudhoe Bay area, 1953-75. Cox,	Full-depth pavement considerations in seasonal frost areas.
Offshore oil in the Alaskan Arctic. Weeks, W.F., et al. 1984, p.371-376, MP 1743	G.F.N., et al, [1981, p.799-808] MP 1457	Baton, R.A., et al, [1979, 24p.] MP 1188
Horizontal salinity variations in sea ice. Tucker, W.B., et al,	Application of a numerical sea ice model to the East Green- land area. Tucker, W.B., [1981, 109p.] MIP 1535	Resilient response of two frozen and thawed soils. Chamber- lain, E.J., et al. (1979, p.257-271) MP 1176
[1984, p.6505-6514] MP 1761	Dynamics of near-shore ice. Kovacs, A., et al. (1981,	lain, B.J., et al, [1979, p.257-271] MP 1176 Relationships between January temperatures and the winter
Static determination of Young's modulus in sea ice. Richter-	p.125-1351 MP 1599	regime in Germany. Bilello, M.A., et al, [1979, p.17-27]
Menge, J.A., [1984, p.283-286] MIP 1789	Ice distribution and winter ocean circulation, Kachemak Bay,	MP 1218
Crystalline structure of urea ice sheets. Gow, A.J., [1984, 48p.]	Alaska. Gatto, L.W., [1981, 43p.] CR 81-22	High-explosive cratering in frozen and unfrozen soils in Alas-
MIZEX 83 mesoscale sea ice dynamics: initial analysis. Hi-	Modeling pressure ridge buildup on the geophysical scale. Hibler, W.D., III, 1982, p.141-1551 MP 1590	ka. Smith, N., [1980, 21p.] CR 80-09
bler, W.D., III, et al, [1984, p.19-28] MP 1811	Ice growth and circulation in Kachemak Bay, Alaska. Daly,	Haul Road performance and associated investigations in Alas- ka. Berg. R.L., [1980, p.53-100] MP 1351
MIZEX 84 mesoscale sea ice dynamics: post operations re-	S.F., [1982, p.(C)1-(C)9] MP 1501	Environmental engineering, Yukon River-Prudhoe Bay Haul
port. Hibler, W.D., III, et al, [1984, p.66-69] MP 1257	Ice distribution and water circulation, Kachemak Bay, Alsaka.	Road. Brown, J., ed, (1980, 187p.) CR 86-19
Mesoscale air-ice-ocean interaction experiments. Johan-	Gatto, L.W., (1982, p.421-435) MP 1569	Tundra and analogous soils. Everett, K.R., et al, [1981,
nessen, O.M., ed, [1984, 176p.] SR 84-29	Modeling fluctuations of arctic aea ice. Hibler, W.D., III, et al, [1982, p.1514-1523] MP 1579	p.139-179j MP 1465
Sea ice properties. Tucker, W.B., III, et al., (1984, p.82-83)	al, [1982, p.1514-1523] MIP 1579 Observations of pack ice properties in the Weddell Sea.	Pavement deflection after freezing and thawing. Chamber- lain, E.J., [1981, 10p.] CR 81-15
MP 2136	Ackley, S.F., et al, [1982, p.105-106] MP 1608	Radar profiling of buried reflectors and the groundwater table.
Discussion: Electromagnetic properties of sea ice by R.M. Morey, A. Kovacs and G.F.N. Cox. Arcone, S.A., [1984,	See ice state during the Weddell See Expedition. Ackley,	Sellmann, P.V., et al, [1983, 16p.] CR 83-11
p.93-94 ₁ MP 1821	S.F., et al. [1983, 6p. + 59p.] SR 83-2	Revised procedure for pavement design under sessonal frost
Authors' response to discussion on: Electromagnetic proper-	Sea ice on the Norton Sound and adjacent Bering Sea coast.	conditions. Berg, R., et al, [1983, 129p.] SR 83-27
ties of sea ice. Morey, R.M., et al. (1984, p.95-97)	Kovaca, A., [1983, p.654-666] MP 1699	Seasonal variations in plant qualities in trade, calls
MP 1822	Ice properties in the Greenland and Barents Seas during summer. Overgaard, S., et al, (1983, p.142-164)	Seasonal variations in plant nutrition in tundra soils. McCown, B.H., et al, [1971, p.55-57] MP 904
Structure, salinity and density of multi-year sea ice pressure ridges. Richter-Menge, J.A., et al., [1985, p.194-198]	MP 2062	See ice conditions in the Arctic. Weeks, W.F., (1976,
MP 1857	Offshore petroleum production in ice-covered waters. Tuck-	p.173-205 ₁ MIP 910
Tensile strength of multi-year pressure ridge sea ice samples.	er, W.B., [1983, p.207-215] MP 2006	Dating annual layers of Greenland ice. Langway, C.C., Ir.,
Cox, G.F.N., et al, [1985, p.186-193] MP 1856	Size and shape of ice floes in the Baltic Sea in spring. Lep- paranta, M., [1983, p.127-136] MP 2061	et al, [1977, p.302-306] MIP 1094
Numerical modeling of sea ice dynamics and ice thickness. Hibler, W.D., III, 1985, 50p., CR 85-05	pitranta, M., [1983, p.127-136] MP 2861 Antarctic sea ice microwave signatures. Comiso, J.C., et al,	Electromagnetic surveys of permafrost. Arcone, S.A., et al., [1979, 24p.] CR 79-23
Hibler, W.D., III, [1985, 50p.] CR 85-05 Numerical simulation of Northern Hemisphere sea ice varia-	(1984, p.662-672) MP 1668	Physical oceanography of the seasonal sea ice zone.
bility, 1951-1980. Walsh, J.B., et al, (1985, p.4847-	Mechanism for floe clustering in the marginal ice zone. Lep-	McPhee, M.G., (1980, p.93-132) MIP 1294
4865 ₁ MP 1882	paranta, M., et al, [1984, p.73-76] MIP 1785	Problems of the sessonal sea ice zone. Weeks, W.F., [1980,
Energy exchange over antarctic sea ice in the spring. An-	Drag coefficient across the Antarctic marginal ice zone. An-	p.1-35 ₁ MP 1293
dress, E.L., et al, [1985, p.7199-7212] MP 1889 Pressure ridge and sea ice properties Greenland Sea. Tucker.	dress, E.L., et al, [1984, p.63-71] MP 1784	Numerical modeling of sea ice in the seasonal sea ice zone.
W.B., ct al, [1985, p.214-223] MP 1935	Modeling the marginal ice zone. Hibler, W.D., III, ed, [1984, 99p.] SR 84-67	Hibler, W.D., III, (1980, p.299-356) MP 1296 Road dust along the Haul Road, Alaska. Everett, K.R.,
Numerical simulation of sea ice induced gouges on the shelves	On the decay and retreat of the ice cover in the summer MIZ.	[1980, p.101-128] MP 1352
of the polar oceans. Weeks, W.F., et al, [1985, p.259-	Maykut, G.A., [1984, p.15-22] MP 1780	Modeling a variable thickness sea ice cover. Hibler, W.D.,
265 ₁ MP 1938	Large-scale ice/ocean model for the marginal ice zone. Hi-	III, _[1980, p.1943-1973 _] MP 1424
Ice electrical properties. Gow, A.J., [1985, p.76-82] MP 1910	bler, W.D., III, et al, [1984, p.1-7] MIP 1778	Sessonal growth and accumulation of N, P, and K by grass
Dielectric properties at 4.75 GHz of saline ice slabs. Arcone,	Ses ice data buoys in the Weddell Sea. Ackley, S.F., et al,	irrigated with wastes. Palazzo, A.J., [1981, p.64-68] MCP 1425
S.A., et al, [1985, p.83-86] MP 1911	[1984, 18p.] CR 84-11 Model simulation of 20 years of northern hemisphere ses-ice	Ocean circulation: its effect on seasonal sea-ice simulations.
Physical properties of sea ice in the Greenland Sea. Tucker,	fluctuations. Walsh, J.E., et al. [1984, p.170-176]	Hibler, W.D., III, et al, [1984, p.489-492] MP 1766
W.B., et al, [1985, p.177-188] MIP 1903	MP 1767	Numerical simulation of Northern Hemisphere sea ice varia-
Electromagnetic properties of multi-year sea ice. Morey, R.M., et al, [1985, p.151-167] MP 1902	Role of sea ice dynamics in modeling CO2 increases. Hibler,	bility, 1951-1980. Wainh, J.E., et al, [1985, p.4847-4865] MF 1882
Laboratory studies of acoustic scattering from the underside	W.D., III, [1984, p.238-253] MP 1749	4865 ₁ MP 1882 Sediment transport
of sea ice. Jezek, K.C., et al, [1985, p.87-91]	Shore ice override and pileup features, Beaufort Sea. Kovaca, A., [1984, 28p. + map] CR 84-26	Influence of irregularities of the bed of an ice sheet on deposi-
MP 1912	Air-ice-ocean interaction experiments in Arctic marginal ice	tion rate of till. Nobles, L.H., et al, [1971, p.117-126]
Compressive strength of multi-year sea ice. Kovacs, A., 1985, p.116-127; MP 1901	zones. (1984, 56p.) SR 84-28	MP 1009
Electromagnetic measurements of multi-year sea ice using	Arctic sea ice and naval operations. Hibler, W.D., III, et al,	Permafrost and vegetation maps from BRTS imagery. And-
impulse radar. Kovacs, A., et al, [1985, 26p.]	[1984, p.67-91] MP 1994	erson, D.M., et al., (1973, 75p.) MP 1003
CR 85-13	See ice penetration in the Arctic Ocean. Weeks, W.F.,	Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] MIP 1523
Field tests of the kinetic friction coefficient of sea ice. Tatinclaux, J.C., et al, [1985, 20p.] CR 85-17	[1984, p.37-65] MP 1993 Air-ice ocean interaction in Arctic marginal ice zones:	Circulation and sediment distribution in Cook Inlet, Alaska.
Mechanical properties of multi-year sea ice. Phase 2: Test	MIZEX-West. Wadhama, P., ed, [1985, 119p.]	Gatto, L.W., [1976, p.205-227] MP 895
results. Cox, G.F.N., et al, [1985, 81p.] CR 85-16	SR 85-06	Effect of open water disposal of dredged sediments. Blom,
Role of plastic ice interaction in marginal ice zone dynamics.	Heat and moisture advection over antarctic sea ice. An-	B.B., et al, [1976, 183p.] MP 967
Leppliranta, M., et al, [1985, p.11,899-11,909] MP 1544	dress, E.L., [1985, p.736-746] MIP 1888	Baseline data on the oceanography of Cook Inlet, Alaska. Gatto, L.W., [1976, 84p.] CR 76-25
Electromagnetic measurements of sea ice. Kovaca, A., et al,	Modeling sessice dynamics. Hibler, W.D., III, [1985, p.549-579] MP 2001	loe and navigation related sedimentation. Wuebben, J.L., et
[1986, p.67-93] MP 2020	Remote sensing of the Arctic seas. Weeks, W.F., et al.	al. r1978, p.393-4031 MP 1133
Physical properties of the sea ice cover. Weeks, W.P.,	[1986, p.59-64] MP 2117	Sediments of the western Matanuska Glacier. Lawson, D.B.,
[1986, p.87-102] MP 2047	Ice floe distribution in the wake of a simple wedge. Tatin-	[1979, 112p.] CR 79-09 Pebble orientation ice and glacial deposits. Lawson, D.E.,
Sea ice microbial communities in Antarctica. Garrison, D.L., et al, [1986, p.243-250] MP 2026	claux, J.C., [1986, p.622-629] MP 2038	[1979, p.629-645] NIP 1276
Sea ice distribution	See level	Distribution and features of bottom sediments in Alaskan
Ice dynamics, Canadian Archipelaso and adjacent Arctic ba-	Glaciology's grand unsolved problem. Weertman, J., [1976, p.284-286] MP 1856	coestal waters. Sellmann, P.V., [1980, 50p.]
sin. Ramseier, R.O., et al, (1975, p.853-877)	Comparison of different sea level pressure analysis fields in	SR 90-15
MP 1585	the East Greenland Sea. Tucker, W.B., 1983, p.1084-	Sediment displacement in the Ottauquechee River—1975- 1978. Martinson, C.R., [1980, 14p.] SR 80-20
Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] MP 895	1088 ₁ MP 1737	Diamictons at the margin of the Matanuska Glacier, Alaska.
Sea ice roughness and floe geometry over continental shelves.	See spray	Lawson, D.B., [1981, p.78-84] MP 1462
Weeks, W.F., et al, [1977, p.32-41] MP 1163	Ice accretion on ships. Itagaki, K., [1977, 22p.]	Sediment load and channel characteristics in subarctic upland
Sea ice studies in the Weddell Sea region aboard USCGC	Assessment of ice accretion on offshore structures. Minsk,	Sediment load and channel characteristics in subarctic upland catchments. Slaughter, C.W., et al., [1981, p.39-48] MP 1518
Sea ice studies in the Weddell Sea region aboard USCGC Burton Island. Ackley, S.F., [1977, p.172-173] MP 1014	L.D., [1984, 12p.] SR 84-04	Subserial sediment flow of the Matanuska Glacier, Alaska.
Problems of offshore oil drilling in the Beaufort Sea. Weller.	Measurement of icing on offshore structures. Minsk, L.D.,	Lawson, D.E., [1982, p.279-300] MP 1896
G., et al, [1978, p.4-11] MP 1250	(1985, p.287-292) MP 2010	Shoreline erosion and shore structure damage on the St.
Sea ice ridging over the Alaskan continental shelf. Tucker,	See water Environmental atlas of Alaska. Hartman, C.W., et al,	Marys River. Wuebben, J.L., [1983, 36p.] SR 83-15
W.B., et al, [1979, 24p.] CR 79-08 Overview on the seasonal sea ice zone. Weeks, W.F., et al,	(1978, 95p.) MP 1294	Tanana River monitoring and research studies near Pair-
(1979, p.320-337) MP 1329	Geochemistry of subsea permafrost at Prudhoe Bay, Alaska.	banka, Alaska. Neill, C.R., et al, [1984, 98p. + 5 appends.] SR 84-37
Sea ice ridging over the Alaskan continental shelf. Tucker,	Page, F.W., et al, [1978, 70p.] SR 78-14	Potential use of SPOT HRV imagery for analysis of coastal
W.B., et al, [1979, p.4885-4897] MP 1249	Using sea ice to measure vertical heat flux in the ocean.	sediment plumes. Band, L.E., et al, [1984, p.199-204]
Mass-balance aspects of Weddell Sea pack-ice. Ackley, S.F.,	McPhee, M.G., et al. (1982, p.2071-2074) MP 1521	MP 1744
[1979, p.391-405] MP 1286 Problems of the seasonal sea ice zone. Weeks, W.F., [1980,	Sensitivity of vegetation and soil flors to seawater spills, Alaska. Simmons, C.L., et al, [1983, 35p.] CR 83-24	Shoreline erosion processes: Orwell Lake, Minnesota. Reid, J.R., [1984, 101p.] CR 84-32
p.1-35) MP 1293	Scaling	Use of remote sensing for the U.S. Army Corps of Engineers
Chosnoflagellata from the Weddell Sea, summer 1977.	Wastewater stabilization pond linings. Middlebrooks, B.J.,	dredging program. McKim, H.L., et al. (1985, p.1141-
Buck, K.R., [1980, 26p.] CR 80-16	et al, (1978, 116p.) SR 78-28	1150j MIP 1890

Study of sea ice induced gauges in the sea floor. Weeks, W.F., et al. (1985, p.126-135) MP 1917 Numerical simulation of sea ice induced gauges on the shelves	Analysis of infiltration results at a proposed North Carolina wastewater treatment site. Abele, G., et al, [1984, 24p.; SR 54-11	Sewage treatment Waste management in the north. Rice, E., et al., [1974, p.14-21] MP 1048
of the polar oceans. Weeks, W.F., et al, [1985, p.259-265] MP 1930	Problems with rapid infiltration—a post mortem analysis. Reed, S.C., et al, [1984, 17p. + figs.] MP 1944	Land treatment in relation to waste water disposal. D.H., et al, 11976, p.60-621 MP 369
Data acquisition in USACRREL's flume facility. Daly, S.F., et al., (1985, p.1053-1058) MP 2009 Sedimentation	Nitrogen removal in cold regions trickling filter systems. Reed, S.C., et al, [1986, 39p.] SR 86-92 Selamic reflection	Rapid infiltration of primary sewage effluent at Fort Devena, Massachusotta. Satterwhite, M.B., et al., [1976, 34p.] CR 76-48
Bessline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., £1973, 11p.; MP 1523	Hyperbolic reflections on Beaufort Sea seismic records. Neave, K.G., et al, (1981, 16p.) CR \$1-62	Treatment of primary sewage effluent by rapid infiltration. Satterwhite, M.B., et al. [1976, 15p.] CR 76-49
Estuarine processes and intertidal habitata in Grays Harbor, Washington: a demonstration of remote sensing techniques.	Seismic refraction Seismic site characterization techniques, Münster Nord,	Land treatment of wastewater at West Dover, Vermont. Bouzoun, J.R., [1977, 24p.] SR 77-33
Gatto, L.W., [1978, 79p.] CR 78-18 Stratified debris in Antarctic ice cores. Gow, A.J., et al.	FRG. Albert, D.G., [1982, 33p.] CR 82-17 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et	Wastewater treatment alternative needed. Iskandar, I.K., et al., [1977, p.82-87] MP 968
(1979, p.185-192) MP 1272 Removal of organics by overland flow. Martel, C.J., et al,	al, [1982, 62p.] CR 82-24 Scismic velocities and subsea permafrost in the Beaufort Sea,	Land treatment: present status, future prospects. Pound, C.B., et al, [1978, p.98-102] MP 1417
[1980, 9p.] MP 1362 Deposits in the glacial environment. Lawson, D.E., [1981,	Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1665	Mass water balance during spray irrigation with wastewater at Deer Creek Lake land treatment site. Abele, G., et al,
16p. ₁ CE \$1-27 Pebble fabric in an ice-rafted diamicton. Domack, E.W., et	Science surveys Analysis of explosively generated ground motions using	[1978, 43p.] SR 79-29
al, (1985, p.577-591) MP 1959 SEDIMENTS	Analysis of explosively generated ground motions using Fourier techniques. Blouin, S.E., et al, 1976, 86p., CR 76-28	Cost of land treatment systems. Reed, S.C., et al, 1979, 135p.; MP 1387
Patterned ground in Alaska. Péwé, T.L., et al, (1969, 87p.) MP 1180	Sea ice north of Alaska. Kovacs, A., [1978, p.7-12] MP 1252	Development of a rational design procedure for overland flow systems. Martel, C.J., et al., [1982, 29p.] CR 82-02 Energy conservation and water pollution control facilities.
Sediments ERTS mapping of Arctic and subarctic environments. And-	Creep rupture at depth in a cold ice sheet. Colbeck, S.C., et al, [1978, p.733] MP 1168	Martel, C.J., et al, [1982, 18p.] SR 82-24
erson, D.M., et al, [1974, 128p.] MP 1047 Effect of temperature on the strength of frozen silt. Haynes,	Geophysics in the study of permafrost. Scott, W.J., et al, [1979, p.93-115] MP 1266	Restoration of acidic dredge soils with sewage sludge and lime. Palazzo, A.J., (1983, 11p.) CR 83-28
F.D., et al. (1977, 27p.) CR 77-03 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska.	Distribution and properties of subsea permafrost of the Beau- fort Sea. Sellmann, P.V., et al, [1979, p.93-115]	Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al. 1984.
Page, F.W., et al. 1978, 70p.; SR 78-14 Direct filtration of streamborne glacial silt. Ross, M.D., et	MP 1287 Features of permafrost beneath the Beaufort Sea. Sellmann,	40p. ₁ SE 84-08 Shear flow
al, (1982, 17p.) CR 82-23 Modifications of permafrost, East Oumalik, Aleska. Law-	P.V., et al, [1980, p.103-110] MIP 1344 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et	Effect of size on stresses in shear flow of granular materials, Pt.1. Shen, H.H., [1985, 18p.] CR 85-02
son, D.B., [1982, 33p.] CR 82-36 Ground ice in perennially frozen sediments, northern Alaska.	al, 1982, 62p.; CR 82-24 Effects of snow on vehicle-generated sciamic signatures. Al-	Effect of size on stresses in shear flow of granular materials, Pt.2. Shen, H.H., [1985, 20p.] CR 85-03
Lawson, D.E., [1983, p.695-700] MP 1661	bert, D.G., [1984, p.83-109] MP 2074 Seismic surveys of shallow subsea permafrost. Neave, K.G.,	Constitutive relations for a planar, simple shear flow of rough disks. Shen, H.H., et al. (1985, 17p.) CR 85-20
Bank recession of the Tanana River, Alaska. Gatto, L.W., [1984, 59p.] MP 1746	et al, (1985, p.61-65) MP 1954 Seismic velocity	Shear properties Mitigative and remedial measures for chilled pipelines in dis-
Impact of dredging on water quality at Kewaumee Harbor, Wisconsin. Iskandar, I.K., et al, [1984, 16p.] CR 84-21	Surface-wave dispersion in Byrd Land. Acharya, H.K., [1972, p.955-959] MP 992	continuous permafrost. Sayles, F.H., [1984, p.61-62] MP 1974
Techniques for measuring Hg in soils and sediments. Cragin, J.H., et al, (1985, 16p.) SR 85-16	Delineation and engineering of subsea permafrost, Beaufort Sea. Sellmann, P.V., et al. [1981, p.137-156]	Uplifting forces exerted by adfrozen ice on marine piles. Christensen, F.T., et al, [1985, p.529-542] MP 1905
Explosives in soils and sediments. Cragin, J.H., et al, [1985, 11p.] CR 85-15	MP 1600 Determining distribution patterns of ice-bonded permafrost in	Shear strain Dynamics of snow avalanches. Mellor, M., [1978, p.753-
Tensile strength of frozen silt. Zhu, Y., , [1986, p.15-28] MP 1971	the U.S. Beaufort Sea from seismic data. Neave, K.G., et al, [1984, p.237-258] MP 1839	792 ₃ MP 1070 Shear strength
Seepage Land treatment of wastewaters. Reed, S.C., et al, [1974,	Selemology Fluid dynamic analysis of volcanic tremor. Ferrick, M.G., et	Compressive and shear strengths of fragmented ice covers. Cheng, S.T., et al, [1977, 82p.] MP 951
p.12-13 ₁ MP 1036 Land a catment of wastewaters for rural communities. Reed,	al, [1982, 12p.] CR \$2-32 Observations of volcanic tremor at Mount St. Helens volcano.	Field investigations of a hanging ice dam. Beltaos, S., et al. [1982, p.475-488] MP 1533
S.C., et al, (1975, p.23-39) MP 1399 Reclamation of wastewater by application on land. Iakandar,	Fehler, M., [1984, p.3476-3484] MP 1770 Biffect of snow on vehicle-generated scismic signatures. Al-	How effective are icephobic coatings. Minsk, L.D., [1983, p.93-95]
L.K., et al, [1976, 15p.] MP 896	bert, D.G., [1984, 24P.] CR 84-23 Review of methods for generating synthetic seismograms.	Shear strength in the zone of freezing in saline soils. Chamberlain, B.J., [1985, p.566-574] MP 1879
Wastewater renovation by a prototype slow infiltration land treatment system. Iskandar, I.K., et al, [1976, 44p.] CR 76-19	Pock, L., [1985, 39p.] CR 85-10 Semiconductors (materials)	Shear strength anisotropy in frozen saline and freshwater soils. Chamberlain, E.J., [1985, p.189-194]
Treatment of primary sewage effluent by rapid infiltration. Satterwhite, M.B., et al, (1976, 15p.) CR 76-49	Using electronic measurement equipment in winter. Atkins, R.T., [1981, 7p.] TD 81-01	MP 1931 Vibration analysis of the Yamachiche lightpier. Haynes,
Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al., [1977, p.489-510] MP 976	Settlement (structural) Piles in permafrost for bridge foundations. Crory, F.B., et al,	F.D., [1986, p.238-241] MP 1989 Ice properties in a grounded man-made ice island. Cox,
Wastewater treatment alternative needed. Iskandar, I.K., et al, [1977, p.82-87] MP 968	[1967, 41p.] Slumping failure of an Alaskan earth dam. Collins, C.M., et	G.P.N., et al, (1986, p.135-142) MP 2032 Sheer stress
Nitrogen behavior in land treatment of wastewater: a simpli- fied model. Selim, H.M., et al. [1978, p.171-179]	al, [1977, 21p.] SR 77-21 Kotzebue hospital—a case study. Crory, F.B., [1978,	Forces on an ice boom in the Beauharnois Canal. Perham, R.B., et al, (1975, p.397-407) MP 858
MP 1149 NO3-N in percolate water in land treatment. Iskandar, I.X.,	p.342-359 MP 1034 Construction of an embankment with frozen soil. Botz, J.J.,	Measuring the uniaxial compressive strength of ice. Haynes, F.D., et al, [1977, p.213-223] MP 1627
et al, [1978, p.163-169] MP 1148 Wastewater stabilization pond linings. Middlebrooks, E.J.,	et al, (1980, 105p.) SR 80-21 Foundations on permafrost, US and USSR design and prac-	Effect of freeze-thaw cycles on resilient properties of fine- grained soils. Johnson, T.C., et al, (1978, 19p.)
et al, [1978, 116p.] SR 78-28 Energy requirements for small flow wastewater treatment sys-	tice. Plah, A.M., (1983, p.3-24) MP 1682 Creep of a strip footing on ice-rich permafrost. Sayles, F.H.,	MP 1962 Preeze thaw effect on resilient properties of fine soils. John-
tems. Middlebrooks, E.J., et al, [1979, 82p.] SR 79-07	[1985, p.29-51] MP 1731 Partial verification of a thaw settlement model. Guymon,	son, T.C., et al. [1979, p.247-276] MP 1226 Pressure waves in snow. Brown, R.L., [1980, p.99-107]
Energy requirements for small flow wastewater treatment sys- tems. Middlebrooks, E.J., et al. [1979, 82p.]	G.L., et al, (1985, p.18-25) MP 1924 Hydraulic properties of selected soils. Ingersoll, J., et al,	MP 1306 Messurement of the shear stress on the underside of simulated
Land treatment systems and the environment. McKim,	[1985, p.26-35] MP 1925 Sewage	ice covers. Calkins, D.J., et al, [1980, 11p.]
H.L., et al. [1979, p.201-225] MP 1414 Water movement in a land treatment system of wastewater by	Utilization of sewage sludge for terrain stabilization in cold regions. Gaskin, D.A., et al, [1977, 45p.] SR 77-37	Analysis of velocity profiles under ice in shallow streams. Calkins, D.J., et al, [1981, p.94-111] MP 1397
overland flow. Nakano, Y., et al, [1979, p.185-206] MP 1285	Heat recovery from primary effluent using heat pumps. Phetteplace, G.E., et al, [1985, p.199-203] MP 1978	Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478
Cost of land treatment systems. Reed, S.C., et al, [1979, 135p.] MP 1387	Sewage disposal Utility distribution systems in Iceland. Asmot, H.W.C.,	Vehicle tests and performance in snow. Berger, R.H., et al,
Functional analysis of the problem of wetting fronts. Naka- no, Y., (1980, p.314-318) MP 1307	(1976, 63p.) SR 76-05 Utility distribution systems in Sweden, Finland, Norway and	(1981, p.51-67) MP 1477 Asymmetric flows: application to flow below ice jams.
Energy and costs for agricultural reuse of wastewater. Sletten, R.S., et al, [1980, p.339-346] MP 1401	England. Aamot, H.W.C., et al, [1976, 121p.] SR 76-16	Gogta, M., et al. [1981, p.342-350] MP 1733 Porce distribution in a fragmented ice cover. Daly, S.P., et
Removal of organics by overland flow. Martel, C.J., et al. (1980, 9p.) MP 1362	Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al, [1977, p.489-510] MP 976	al, [1982, p.374-387] MP 1531 Model study of Port Huron ice control structure; wind stress
Soil infiltration on land treatment sites. Abele, G., et al. [1980, 41p.] SR 89-36	Effects of wastewater and sludge on turfgrasses. Palazzo, A.J., [1978, 11p.] SR 78-29	simulation. Sodhi, D.S., et al, [1982, 27p.]
Hydraulic characteristics of the Deer Creek Lake land treat- ment site during wastewater application. Abele, G., et al.	Sewage sludge for terrain stabilization, Part 2. Gaskin, D.A., et al, [1979, 36p.] SR 79-28	Flow velocity profiles in ice-covered shallow streams. Cal- kins, D.J., et al, [1982, p.236-247] MP 1546
[1981, 37p.] CR 81-67 Land treatment of westewater. Reed, S.C., [1982, p.91-	Utilization of sewage studge for terrain stabilization in cold regions. Pt. 3. Rindge, S.D., et al, [1979, 33p.] SR 79-34	Asymmetric plane flow with application to ice jama. Tatin- claux, J.C., et al, [1983, p.1540-1556] MP 1645
123 ₁ MP 1947 Horizontal infiltration of water in porous materials. Nakano,	reflector. a m. c. comments, oversit on and firsted policy	
nonzoniai miniradon of water in porous materiais. Rakano,	Revegetation at two construction sites in New Hampshire and	Porce distribution in a fragmented ice cover. Stewart, D.M., et al, [1984, 16p.] CR 84-67
Y., 1982, p.156-166) Land application systems for wastewater treatment. MP 1846 S.C., 1983, 26p. + figs.; MP 1946	SR 79-34 Revegetation at two construction sites in New Hampshire and Alaska. Palazzo, A.J., et al., [1980, 21p.] CR 89-03 Sewage sludge aids revegetation. Palazzo, A.J., et al., [1982, p.198-301] MP 1735	Force distribution in a fragmented ice cover. Stewart, D.M.,

Shelters Observations during BRIMFROST '83. Bouzoun, J.R., et al., [1984, 36p.]	Site selection methodology for the land treatment of wastewater. Ryan, J.R., et al, [1981, 74p.] SR 81-28	Shallow snow model for predicting vehicle performance. Harrison, W.L., [1981, 21p.] CR 81-20 Climate of remote areas in north-central Alaska: 1975-1979
Ship icing Lee accumulation on ocean structures. Minek, L.D., [1977, 42p.] CR 77-17	Numerical studies for an airborne VLF resistivity survey. Arcone, S.A., [1977, 10p.] CR 77-65 Runway site survey, Pensacola Mountains, Antarctica.	summary. Haugen, R.K., [1982, 110p.] CR 82-35 Case study of land treatment in a cold climate—West Dover, Vermont. Bouzoun, J.R., et al. [1982, 96p.]
Ice accretion on ships. Itagaki, K., [1977, 22p.] SR 77-27 Los observation program on the semisubmensible drilling ves-	Kovaca, A., et al, [1977, 45p.] Remote sensing for land treatment site selection. Merry, C.J., [1978, p.107-119] MP 1146	Snow concentration and effective air density during snow- falls. Mellor, M., (1983, p.505-507) MP 1769
sel SEDCO 706. Minsk, L.D., (1984, 14p.) SR 84-62 Assessment of ice accretion on offshore structures. Minsk,	Recommendations for implementing roof moisture surveys in the U.S. Army. (1978, 8p.) SR 78-01 Post occupancy evaluation of a planned community in Arctic	Surface-wave dispersion in Byrd Land. Acharya, H.K., [1972, p.955-959] MP 992
L.D., [1984, 12p.] SR 84-64 Introduction to heat tracing. Henry, K., [1986, 20p.] TD 86-01	Canada. Bechtel, R.B., et al., [1980, 27p.] SR 80-06 Post occupancy evaluation for communities in hot or cold regions. Bechtel, R.B., et al., [1980, 57p.] SR 80-29	Acoustic emissions in the investigation of avalanches. St. Lawrence, W.F., [1977, p.VII/24-VII/33] MP 1630
Ships Towing ships through ice-clogged channels by warping and	Remote sensing for earth dam site selection and construction materials. Merry, C.J., et al, [1980, p.158-170] MP 1316	Acoustic emission response in polycrystalline materials. St. Lawrence, W.F., [1979, p.223-228] MP 1246 Acoustic emission response of snow. St. Lawrence, W.F.,
kedging. Mellor, M., _[1979, 21p.] CR 79-21 Ship resistance in thick brash ice. Mellor, M., _[1980, p.305-321] MP 1329	Introduction to abiotic components in tundra. [1981, p.79] Slode Brown, J., MP 1432	[1980, p.209-216] MP 1366 Snow Symposium, 1st, Hanover, NH, Aug. 1981. [1982, 324p.] SE 82-17
Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al, [1981, 27p.] CR 81-65 State of the art of ship model testing in ice. Vance, G.P.,	Dynamic friction of bobaled runners on ice. Huber, N.P., et al, (1985, 26p.) MP 2882	Comparative near-millimeter wave propagation properties of snow or rain. Nemarich, J., et al, [1983, p.115-129] MP 1690
(1981, p.693-706) MP 1573 Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., (1983, 62p.) SR 83-11	Slege erientation Roof response to icing conditions. Lane, J.W., et al., 1979, 40p.; CR 79-17	Detection of sound by persons buried under snow avalanche. Johnson, J.B., [1984, p.42-47] MP 1928 Audibility within and outside * posited snow. Johnson, J.B.,
Boom for shipboard deployment of meteorological instru- ments. Andreas, E.L., et al., [1983, 14p.] SR 83-28 Sheek waves	Tundra soils on the Arctic Slope of Alaska. Everett, K.R., et al., [1982, p.264-280] MP 1552 Uniform snow loads on structures. O'Rourke, M.J., et al.,	[1985, p.136-142] MP 1966 Snew bearing strength The strength of natural and processed snow. Abele, G.,
Ground pressures exerted by underground explosions. Johnson, P.R., [1978, p.284-290] MP 1520 Analysis of plastic shock waves in snow. Brown, R.L.,	[1982, p.2781-2798] MP 1574 Analysis of roof snow load case studies; uniform loads. O'- Rourks, M., et al. [1983, 29p.] CR 83-61	(1975, p.176-186) MP 1838 Mechanical properties of snow used as construction material. Wuori, A.F., [1975, p.157-164] MP 1857
[1979, 14p.] CR 79-29 Pressure waves in snow. Brown, R.L., [1980, p.99-107] MP 1306	Slope processes Drainage network of a subarctic watershed. S.R., et al, (1979, 9p.) SR 79-19	Study of piles installed in polar snow. Kovaca, A., 1976, 132p.; CR 76-23 Snow compaction
Dynamic testing of free field stress gages in frozen soil. Aitk- en, G.W., et al, 1980, 26p., SR 90-30 Propagation of stress waves in alpine snow. Brown, R.L.,	Shoreline erosion processes: Orwell Lake, Minnesota. Reid, J.R., [1984, 101p.] CR 84-32 Erosion of northern reservoir shores. Lawson, D.E., [1985,	Mechanical properties of snow used as construction material. Wuori, A.F., [1975, p.157-164] MP 1057 The strength of natural and processed snow. Abele, G.,
(1980, p.235-243) MP 1367 Analysis of non-steady plastic shock waves in snow. Brown, R.L., (1980, p.279-287) MP 1354	198p.; M 85-01 Slope stability Pipeline haul road between Livengood and the Yukon River.	[1975, p.176-186] MP 1658 Sintering and compaction of snow containing liquid water.
Blasting and blast effects in cold regions. Part 1: Air blast. Mellor, M., [1985, 62p.] SR 85-25 Share erosion	Berg, R.L., et al, [1976, 73p.] SR 76-11 Slopes Crude oil spills on subarctic permafrost in interior Alaska.	Colbeck, S.C., et al, [1979, p.13-32] MP 1190 Compaction of wet anow on highways. Colbeck, S.C., [1979, p.14-17] MP 1234
Historical shoreline changes along the outer coast of Cape Cod. Gatto, L.W., [1979, p.69-90] MP 1502	Johnson, L.A., et al, (1980, 67p.) CR 80-29 Shages Reclamation of scidic dredge soils with sewage sludge and	Vehicle tests and performance in snow. Berger, R.H., et al. [1981, p.51-67] MP 1477 Predicting wheeled vehicle motion resistance in shallow
Aerial photointerpretation for shoreline changes. Gatto, L.W., (1980, p.167-170) MP 1503 Shoreline erosion and shore structure damage on the St.	lime. Palazzo, A.J., [1977, 24p.] SR 77-19 Municipal studge management: environmental factors. Reed, S.C., ed, [1977, Var. p.] MP 1406	snow. Blaisdell, G.L., [1981, 18p.] SR 81-36 Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229]
Marys River. Wuebben, J.L., [1983, 36p.] SR 83-15 Brosion of perennially frozen streambanks. Lawson, D.E., [1983, 22p.] CR 83-29	Utilization of sewage studge for terrain stabilization in cold regions. Gaskin, D.A., et al, [1977, 45p.] SR 77-37 Sewage studge for terrain stabilization, Part 2. Gaskin, D.A.,	Snow composition Composition and structure of South Pole snow crystals.
Shoreline erosion processes: Orwell Lake, Minnesota. Reid, J.R., [1984, 101p.] CR 84-32 Brosion of northern reservoir shores. Lawson, D.E., [1985,	et al, [1979, 36p.] SR 79-28 Sewage sludge aids revegetation. Palazzo, A.J., et al, [1982,	Kumai, M., [1976, p.833-841] MP 853 Vanadium and other elements in Greenland ice corea. Herron, M.M., et al., [1976, 4p.] CR 76-24
198p. ₁ M 85-01 Shoreline modification Aerial photography of Cape Cod shoreline changes. Gatto,	Wastewater treatment and reuse process for cold regions. Bouzoun, J.R., [1983, p.547-557] MP 2112	Tracer movement through snow. Colbeck, S.C., [1977, p.255-262] MP 1093 Atmospheric pollutants in snow cover runoff. Colbeck, S.C.,
L.W., (1978, 49p.) Estuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques.	Engineering systems for wastewater treatment. Loehr, R., et al., [1983, p.409-417] MP 1948 Restoration of scidic dredge soils with sewage sludge and	[1981, p.1-10] MP 1586 Nitrogenous chemical composition of antarctic ice and snow. Parker, B.C., et al, [1981, p.79-81; MP 1541
Gatto, L.W., [1978, 79p.] CR 78-18 Historical shoreline changes along the outer coast of Cape Cod. Gatto, L.W., [1979, p.69-90] MP 1502	lime. Palazzo, A.J., [1983, 11p.] CR 83-28 Accumulation, characterization, and stabilization of sludges for cold regions lagoons. Schneiter, R.W., et al., [1984]	Nitrate fluctuations in antarctic snow and firm. Parker, B.C., et al, (1982, p.243-248) MP 1551 Chemical obscurant tests during winter; environmental fate.
Coastal marine geology of the Beaufort, Chukchi and Bering Seas. Gatto, L.W., [1980, 337p.] SR 80-05 Aerial photointerpretation for shoreline changes. Gatto,	40p.; SR 84-68 Shesh Statistics of coarsening in water-saturated snow. Colbeck,	Cragin, J.H., [1982, 9p.] SR \$2-19 Field sampling of snow for chemical obscurants at SNOW- TWO/Smoke Week VI. Cragin, J.H., [1984, p.265-270]
L.W., [1980, p.167-170] MP 1503 Bank erosion of U.S. northern rivers. Gatto, L.W., [1982, 75p.] CR 82-11	S.C., [1986, p.347-352] MP 2015 Small arms ammunition Test of snow fortifications. Farrell, D.R., [1979, 15p.]	MP 2096 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.409-416]
Shoreline erosion and shore structure damage on the St. Marys River. Wuebben, J.L., (1983, 36p.) SR 83-15 Shores	Smoke generators Propane dispenser for cold fog dissipation system. Hicks.	MP 1573 Acidity of anow and its reduction by alkaline aerosols. Kumai, M., [1985, p.92-94] MP 2008
Ice pile-up and ride-up on Arctic and subarctic beaches. Kovacs, A., et al, [1979, p.127-146] MP 1230 Shore ice pile-up and ride-up: field observations, models.	J.R., et al. [1973, 38p.] MP 1033 Field sampling of snow for chemical obscurants at SNOW-TWO/Smoke Week VI. Cragin, J.H., [1984, p.265-270]	Show compression Shallow snow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] MP 1130
theoretical analyses. Kovacs, A., et al, [1980, p.209- 298] MP 1295 Summer air temperature and precipitation in northern Alaska.	MP 2096 Snow chemistry of obscurants released during SNOW-TWO/Smoke Week VI. Cragin, J.H., {1984, p.409-416}, MP 1873	Unconfined compression tests on snow: a comparative study. Kovacs, A., et al, [1977, 27p.] SR 77-29 Compression of wet snow. Colbeck, S.C., et al, [1978,
Haugen, R.K., et al, [1980, p.403-412] MP 1439 Effect of vessel size on shorelines along the Great Lakes channels. Wuebben, J.L., [1983, 62p.] SR 83-11	Study of water drainage from columns of snow. Denoth, A., et al, [1979, 19p.] CR 79-01	17p.] Effect of water content on the compressibility of snow-water mixtures. Abele, G., et al, [1979, 26p.] CR 79-02
Sea ice on the Norton Sound and adjacent Bering Sea coast. Kovacs, A., [1983, p.654-666] MP 1699 Stde looking rader	Dynamics of snow and ice masses. Colbeck, S.C., ed, [1980, 468p.] Snow accumulation	Volumetric constitutive law for snow under strain. Brown, R.L., [1979, 13p.] CR 79-20 Constitutive relation for the deformation of snow. St. Law-
Sea ice roughness and floe geometry over continental shelves. Weeks, W.F., et al., [1977, p.32-41] MP 1163 Extraction of topography from side-looking satellite systems	Snow accumulation for arctic freshwater supplies. Slaughter, C.W., et al., [1975, p.218-224] MP 860 Role of research in developing surface protection measures	rence, W.F., et al., [1981, p.3-14] MP 1379 Snow measurements in relation to vehicle performance. Harrison, W.L., [1981, p.13-24] MP 1473
—a case study with SPOT simulation data. Ungar, S.G., et al, [1983, p.535-550] MP 1695 Signy Island	for the Arctic Slope of Alaska. Johnson, P.R., r1978, p.202-205; MP 1068 Surface protection measures for the Arctic Slope, Alaska.	Workshop on snow traction mechanics, 1979. Harrison, W.L., ed, [1981, 71p.] SR \$1-16 Macroscopic view of snow deformation under a vehicle.
Soil properties of the International Tundra Biome sites. Brown, J., et al, [1974, p.27-48] MP 1043 Simulation	Johnson, P.R., [1978, p.202-205] MP 1519 Snow accumulation, distribution, melt, and runoff. S.C., et al, [1979, p.465-468] MP 1233	Richmond, P.W., et al. [1981, 20p.] SR \$1-17 Snow (construction material) The strength of natural and processed snow. Abele, G.,
Sea ice growth, drift, and decay. Hibler, W.D., III, [1980, p.141-209] MP 1298 Stee accessibility	Relationships between January temperatures and the winter regime in Germany. Bilello, M.A., et al., [1979, p.17-27, MP 1218	[1975, p.176-186] MP 1858 Mechanical properties of snow used as construction material. Wuori, A.F., [1975, p.157-164] MP 1857
Site access for a subarctic research effort. Slaughter, C.W., (1976, 13p.)	Extending the useful life of DYE-2 to 1986. Tobiasson, W., et al, [1980, 37p.] SR 80-13	Defensive works of subarctic snow. Johnson, P.R., 1977, 23p.; CR 77-96

Role of research in developing surface protection measures	Constraints and approaches in high latitude natural resource	Forward-scattering corrected extinction by nonspherical par-
for the Arctic Slope of Alaska. Johnson, P.R., (1978,	sampling and research. Slaughter, C.W., et al, [1984,	ticles. Bohren, C.F., et al, [1985, p.1023-1029]
p.202-205 ₁ MP 1068	p.41-467 MP 2013 Change in orientation of artillery-delivered anti-tank mines in	MP 1958 Temperature dependence of the equilibrium form of ice.
Bullet penetration in snow. Cole, D.M., et al, [1979, 23p.] SR 79-25	snow. Bigl, S.R., [1984, 20p.] CR 84-20	Colbeck, S.C., [1985, p.726-732] MIP 1939
Test of snow fortifications. Farrell, D.R., (1979, 15p.)	Effect of snow on vehicle-generated seismic signatures. Al-	What becomes of a winter snowflake. Colbeck, S.C., 1985,
SR 79-33	bert, D.G., [1984, 24P.] CR 84-23	p.312-215 ₁ MP 2060
Snow fortifications as protection against shaped charge antitank projectiles. Farrell, D.R., [1980, 19p.]	Review of antitank obstacles for winter use. Richmond, P.W., [1984, 12p.] CR 84-25	Snow crystals Elemental compositions and concentrations of micros-
SR 80-11	Water supply and waste disposal in Greenland and Antarc-	pherules in snow and pack ice from the Weddell Sea.
Snow in the construction of ice bridges. Coutermarsh, B.A.,	tica. Reed, S.C., et al, [1985, p.344-350] MP 1792	Kumai, M., et al, [1983, p.128-131] MP 1777
et al. [1985, 12p.] SR 85-18 Snow cover	Audibility within and outside deposited snow. Johnson, J.B., [1985, p.136-142] MP 1960	Snow deformation Compressibility characteristics of compacted snow. Abele,
BRTS mapping of Arctic and subarctic environments. And-	Field demonstration of traction testing procedures. Blais-	G., et al. [1976, 47p.] CR 76-21
erson, D.M., et al, [1974, 128p.] MP 1047	dell, G.L., [1985, p.176] MP 2846	Thermodynamic deformation of wet snow. Colbeck, S.C.,
Boological investigations of the tundra biome in the Prudhoe	Winter tire tests: 1980-81. Blaisdell, G.L., et al, [1985, p.135-151] MP 2045	(1976, 9p.) CR 76-44
Boological investigations of the tundra blome in the Prudhoe Bay Region, Alaska. Brown, J., ed. [1975, 215p.] MP 1053	Mine detection in cold regions using short-pulse radar. Ar-	Acoustic emissions in the investigation of avalanches. St. Lawrence, W.F., [1977, p.VII/24-VII/33] MIP 1630
Generation of runoff from subarctic snowpacks. Dunne, T.,	cone, S.A., [1985, 16p.] SR 85-23	Regelation and the deformation of wet snow. Colbeck, S.C.,
et al, [1976, P.677-685] MP 883	Snow cover stability	et al, [1978, p.639-650] MP 1172
Computer routing of unsaturated flow through snow. Tucker, W.B., et al, [1977, 44p.] SR 77-10	Instrument for determining snow properties related to traffi- cability. Parrott, W.H., et al, [1972, p.193-204]	Effect of water content on the compressibility of snow-water mixtures. Abele, G., et al, [1979, 26p.] CR 79-02
Aerosols in Greenland snow and ice. Kumai, M., (1977,	MP 886	Acoustic emission response in polycrystalline materials. St.
p.341-350 ₁ MP 1725	Acoustic emissions in the investigation of avalanches. St.	Lawrence, W.F., [1979, p.223-228] MP 1246
Water resources by satellite. McKim, H.L., [1978, p.164- 169] MP 1090	Lawrence, W.F., [1977, p.VII/24-VII/33] MP 1630	Volumetric constitutive law for snow under strain. Brown, R.L., 1979, 13p., CR 79-20
Terminal ballistics in cold regions materials. Aitken, G.W.,	Dynamics of snow avalanches. Mellor, M., [1978, p.753-792] MP 1070	R.I., [1979, 13p.] CR 79-20 Analysis of plastic shock waves in snow. Brown, R.L.,
[1978, 6p.] MP 1182	Snow studies associated with the sideways move of DYE-3.	[1979, 14p.] CR 79-29
Modeling snow cover runoff meeting, Sep. 1978. Colbeck,	Tobiasson, W., [1979, p.117-124] MP 1312	Volumetric constitutive law for snow. Brown, R.L., [1980,
S.C., ed, [1979, 432p.] SR 79-36 Winter surveys of the upper Susitna River, Alaska. Bilello,	Snow cover structure Water percolation through homogeneous snow. Colbeck,	p.161-165 ₇ MP 1903 Constitutive relation for the deformation of snow. St. Law-
M.A., [1980, 30p.] SR 80-19	S.C., et al. [1973, p.242-257] MP 1025	rence, W.F., et al. (1981, p.3-14) MP 1370
Impact fuse performance in snow (Initial evaluation of a new	Physical aspects of water flow through snow. Colbeck, S.C.,	Macroscopic view of snow deformation under a vehicle.
test technique). Aitken, G.W., et al, [1980, p.31-45] MP 1347	[1978, p.163-206] MP 1566	Richmond, P.W., et al, [1981, 20p.] SR 81-17
Snow cover characterization. O'Brien, H.W., et al, [1982,	Water flow through heterogeneous snow. Colbeck, S.C., [1979, p.37-45] MP 1219	Firn quake (a rare and poorly explained phenomenon). Den- Hartog, S.L., [1982, p.173-174] MP 1571
p.559-577 ₁ MP 1564	Acoustic emission response in polycrystalline materials. St.	Snow density
Landsat-4 thematic mapper (TM) for cold environments. Gervin, J.C., et al, [1983, p.179-186] MP 1651	Lawrence, W.F., [1979, p.223-228] MP 1246	Mesoscale measurement of snow-cover properties. Bilello,
Water supply and waste disposal on permanent snow fields.	Constitutive relation for the deformation of anow. St. Law- rence, W.F., et al, (1981, p.3-14) MP 1370	M.A., et al, [1973, p.624-643] MP 1029 Compressibility characteristics of compacted snow. Abele,
Reed, S.C., et al, [1984, p.401-413] MP 1714	Overview of seasonal snow metamorphism. Colbeck, S.C.,	G., et al, [1976, 47p.] CR 76-21
Conventional land mines in winter. Richmond, P.W.,	(1982, p.45-61) MP 1500	Update on snow load research at CRREL. Tobiasson, W., et
[1984, 23p.] SR 84-30 Explosive obscuration sub-test results at the SNOW-TWO	Increased heat flow due to snow compaction: the simplistic approach. Colbeck, S.C., [1983, p.227-229]	al, [1977, p.9-13] MP 1142
field experiment. Ebersole, J.F., et al, [1984, p.347-354]	MP 1693	Defensive works of subarctic anow. Johnson, P.R., 1977, 23p.; CR 77-06
MP 1672	Snow crust	Projectile and fragment penetration into ordinary snow.
Permafrost, snow cover and vegetation in the USSR. Bigl, S.R., [1984, 128p.] SR 84-36	Growth of faceted crystals in a snow cover. Colbeck, S.C.,	Swinzow, G.K., (1977, 30p.) MIP 1750
Snow cover distribution	[1982, 19p.] CR 82-29 Snow crystal growth	Effect of water content on the compressibility of snow-water mixtures. Abele, G., et al, [1979, 26p.] CR 79-02
Red and near-infrared spectral reflectance of snow. O'Brien,	Growth of faceted crystals in a anow cover. Colbeck, S.C.,	Snowpack optical properties in the infrared. Berger, R.H.,
H.W., et al. (1975, p.345-360) MP 872	(1982, 19p.) CR 82-29	[1979, 16p.] CR 79-11
Snow accumulation, distribution, melt, and rumoff. Colbeck, S.C., et al, [1979, p.465-468] MP 1233	Snow characterization at SNOW-ONE-B. Berger, R.H., et al, [1983, p.155-195] MP 1847	Pressure waves in snow. Brown, R.L., [1980, p.99-107] MP 1306
Snow cover mapping in northern Maine using LANDSAT.	Theory of metamorphism of dry snow. Colbeck, S.C.,	Propagation of stress waves in alpine snow. Brown, R.L.,
Merry, C.J., et al, [1979, p.197-198] MP 1510	[1983, p.5475-5482] MP 1603	[1980, p.235-243] MP 1367
Snowpack estimation in the St. John River basin. Power, J.M., et al, [1980, p.467-486] MP 1799	Comments on the metamorphism of snow. Colbeck, S.C., 1983, p.149-151; MP 1650	Analysis of non-steady plastic shock waves in snow. Brown, R.L., [1980, p.279-287] MP 1354
Snow characterization at SNOW-ONE-B. Berger, R.H., et	[1983, p.149-151] MP 1650 Comments on "Theory of metamorphism of dry snow" by	Ice characteristics in Whitefish Bay and St. Marys River in
al, [1983, p.155-195] MP 1847	S.C. Colbeck. Sommerfeld, R.A., [1984, p.4963-4965]	winter. Vance, G.P., [1980, 27p.] SR 88-32
Snow cover and meteorology at Allagash, Maine, 1977-1980. Bates, R., (1983, 49p.) SR 83-20	MP 1800	Investigation of the snow adjacent to Dye-2, Greenland.
Using Landsat data for snow cover/vegetation mapping.	What becomes of a winter snowflake. Colbeck, S.C., [1985, p.312-215] MP 2060	Ueda, H.T., et al, (1981, 23p.) SR 81-03 Review of thermal properties of snow, ice and sea ice. Yen,
Merry, C.J., et al, [1984, p.II(140)-II(144)] MP 1975	Snow crystal nuclei	YC., [1981, 27p.] CR 81-10
Regional and seasonal variations in snow-cover density in the	Composition and structure of South Pole snow crystals.	Macroscopic view of snow deformation under a vehicle.
U.S.S.R. Bilello, M.A., [1984, 70p.] CR 84-22 Overview of meteorological and snow cover characterization	Kumai, M., [1976, p.833-841] MP 853	Richmond, P.W., et al. [1981, 20p.] SR 81-17
at SNOW-TWO. Bates, R.E., et al, [1984, p.171-191]	Snow crystal structure Grain clusters in wet snow. Colbeck, S.C., [1979, p.371-	Snow cover characterization. O'Brien, H.W., et al, [1982, p.559-577] MP 1564
MP 1868	384 ₁ MP 1267	Geometry and permittivity of snow at high frequencies. Col-
Dielectric measurements of snow cover. Burns, B.A., et al, (1985, p.829-834) MP 1913	Volumetric constitutive law for snow. Brown, R.L., [1980,	beck, S.C., [1982, p.4495-4500] MIP 1545
Snow cover effect	p.161-165 ₁ MP 1803 Airborne snow and fog distributions. Berger, R.H., t1982,	Deceleration of projectiles in snow. Albert, D.G., et al, [1982, 29p.] CR 82-20
Carbon dioxide dynamics on the Arctic tundra. Coyne, P.I.,	p.217-223 ₁ MP 1562	Permeability of a melting snow cover. Colbeck, S.C., et al,
et al, [1971, p.48-52] MP 903 Abiotic overview of the Tundra Biome Program, 1971.	Snow crystal habit. Koh, G., et al, (1982, p.181-216)	[1982, p.904-908] MP 1565
Weller, G., et al, [1971, p.173-181] MP 906	MF 1561 Geometry and permittivity of snow at high frequencies. Col-	Utilization of the snow field test series results for development of a snow obscuration primer. Ebersole, J.F., et al, [1983,
Effect of snow cover on obstacle performance of vehicles.		
Hanamoto, B., [1976, p.121-140] MP 933	beck, S.C., [1982, p.4495-4500] MIP 1545	p.209-217 ₁ MP 1692
Projectile and freement peneturion into ordinary enough	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the	p.209-217 ₁ MP 1692 Regional and seasonal variations in anow-cover density in the
Projectile and fragment penetration into ordinary snow. Swinzow, G.K., 1977, 30p., MP 1750	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed anow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59-	p.209-217 ₁ MP 1692 Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., [1984, 70p.] CR 84-22
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K.,	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.55-75] MP 1983	p.209-217 ₁ MP 1692 Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., [1984, 70p.) CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow.
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed anow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59- 75] WP 1983 Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al., [1983,	p.209-217 ₁ Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., t1984, 70p. ₁ CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep anow. Abele, G., et al. t1972, p.214-241 ₁ MP 887
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926 Prediction methods for vehicle traction on snow. Harrison,	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.55-75] MP 1983 Visible propagation in falling snow as a function of mass concentration and crystal type. Lacombe, J., et al., [1983, p.103-111] MP 1757	p.209-217 ₁ Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., [1984, 70p.] CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, G., et al., [1972, p.214-241 ₁ MED 887 Mesoscale measurement of snow-cover properties. Bilello,
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926 Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] Shallow snow test results. Harrison, W.L., [1981, p.69-71]	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed anow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59-75] Wisible propagation in falling snow as a function of mass concentration and crystal type. Lacombe, J., et al., [1983, p.103-111] MP 1757 Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al., [1983, p.318]	p.209-217 ₁ MP 1692 Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., [1984, 70p.] CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, G., et al. [1972, p.214-241] MP 887 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al. [1973, p.624-643] MP 1029
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926 Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59- 75] MP 1983 Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al., [1983, p.103-111] MP 1757 Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al., [1983, p.3-185] MP 1754	p.209-217 ₁ Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., [1984, 70p.] CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, G., et al., [1972, p.214-241] MP 887 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al., [1973, p.624-643 ₂ Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., [1977, 16 leaves] MP 1113
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926 Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] MP 1475 Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478 Field investigations of vehicle traction in snow. Harrison,	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed anow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59- 75] Wisible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al, [1983, p.103-111] Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al, [1983, p.3-18] MP 1754 Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-04	p.209-217, Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., (1984, 70p.) CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, G., et al, [1972, p.214-241] MP 887 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al, [1973, p.624-643] MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al, [1977, 16 leaves] MP 113 Snow cover mapping in northern Maine using LANDSAT.
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926 Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478 Pield investigations of vehicle traction in snow. Harrison, W.L., [1981, p.47-48] MP 1476	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed anow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59- 75] MP 1983 Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al, [1983, p.103-111] MP 1787 Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al, [1983, p.3-18] MP 1784 Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-04 Snow characterization at SNOW-ONE-B. Berger, R.H., et	p.209-217, Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., [1984, 70p.] CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, C., et al, [1972, p.214-241] MP 837 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al, [1973, p.624-643] Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al, [1977, 16 leaves] MP 1113 Snow cover mapping in northern Maine using LANDSAT Merry, C.J., et al, [1979, p.197-198] MP 1810
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926 Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] MP 1475 Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1476 Field investigations of vehicle traction in snow. Harrison, W.L., [1981, p.47-48] Application of energetics to vehicle trafficability problems. Brown, R.L., [1981, p.25-38] MP 1474	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59- 75] MP 1983. Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al, [1983, p.103-111] Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al, [1983, p.3-18] MP 1754 Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-04 Snow characterization at SNOW-ONE-B. Berger, R.H., et al, [1983, p.155-195] Snow particle morphology in the seasonal snow cover. Col-	p.209-217, Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., (1984, 70p.) CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, C., et al., [1972, p.214-241] MP 837 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al., [1973, p.624-643] MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., [1977, 16 leaves) MP 1113 Snow cover mapping in northern Maine using LANDSAT. Merry, C.J., et al., [1979, p.197-198) MP 1510 Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, C.P., [1980, 27p.] SR 80-32
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926 Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478 Field investigations of vehicle traction in snow. W.L., [1981, p.47-48] MP 1476 Application of energetics to vehicle trafficability problems. Brown, R.L., [1981, p.25-38] MP 1476 Near-infrared reflectance of snow-covered substrates. O'-	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed anow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59-75] WP 1983 Visible propagation in falling snow as a function of mass concentration and crystal type. Lacombe, J., et al, [1983, p.103-111] Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al, [1983, p.3-18] MP 1754 Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-94 Snow characterization at SNOW-ONE-B. Berger, R.H., et al, [1983, p.155-195] Snow particle morphology in the seasonal snow cover. Colbeck, S.C., [1983, p.602-609]	p.209-217, Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., [1984, 70p.] CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, G., et al, [1972, p.214-241] MP 887 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al, [1973, p.624-645] MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al, [1977, 16 leaves] MP 1113 Snow cover mapping in northern Maine using LANDSAT data. Merry, C.J., et al, [1979, p.191-198] MP 1510 Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, C.P., [1980, 27p.] SR 80-32 Shallow snow test results. Harrison, W.L., [1981, p.69-71)
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926 Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] MP 1475 Shallow snow test results. Harrison, W.L., [1981, p.59-71] MP 1476 Field investigations of vehicle traction in snow. Harrison, W.L., [1981, p.47-48] MP 1476 Application of energetics to vehicle trafficability problems. Brown, R.L., [1981, p.25-38] MP 1474 Near-infrared reflectance of snow-covered substrates. O'-Brien, H.W., et al, [1981, 17p.] CR 81-21	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59- 75] MP 1983. Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al., [1983, p.103-111] Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al., [1983, p.3-18] MP 1754 Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-04 Snow characterization at SNOW-ONE-B. Berger, R.H., et al., [1983, p.155-195] MP 1847 Snow particle morphology in the seasonal snow cover. Col- beck, S.C., [1983, p.602-609] Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1.	p.209-217, Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., (1984, 70p.) CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, G., et al., (1972, p.214-241) MP 887 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al., (1973, p.624-643) MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., (1977, 16 leaves) MP 1113 Snow cover mapping in northern Maine using LANDSAT. Merry, C.J., et al., (1979, p.197-198) MP 1810 Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., (1980, 27p.) SR 80-32 Shallow snow test results. Harrison, W.L., (1981, p.69-71) MP 1478
Swinzow, G.K., [1977, 30p.] Swinzow, G.K., [1977, 30p.] Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478 Field investigations of vehicle traction in snow. W.L., [1981, p.47-48] MP 1476 Application of energetics to vehicle trafficability problems. Brown, R.L., [1981, p.25-38] MP 1476 Near-infrared reflectance of snow-covered substrates. O'-Brien, H.W., et al, [1981, 17p.] Vechicle mobility and snowpack parameters. Berger, R.H., [1983, 26p.] CR 83-16	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed anow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59-75] WP 1983 Visible propagation in falling snow as a function of mass concentration and crystal type. Lacombe, J., et al, [1983, p.103-111] Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al, [1983, p.3-18] MP 1754 Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-94 Snow characterization at SNOW-ONE-B. Berger, R.H., et al, [1983, p.155-195] Snow particle morphology in the seasonal snow cover. Colbeck, S.C., [1983, p.602-609]	p.209-217, Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., [1984, 70p.] CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, C., et al, [1972, p.214-241] MP 837 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al, [1973, p.624-643] MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al, [1977, 16 leaves) MP 1113 Snow cover mapping in northern Maine using LANDSAT. Merry, C.J., et al, [1979, p.197-198) MP 1810 Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., [1980, 27p.] Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478 Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30
Swinzow, G.K., [1977, 30p.] MP 1750 Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] MP 926 Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] MP 1475 Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1476 Field investigations of vehicle traction in snow. Harrison, W.L., [1981, p.47-48] Application of energetics to vehicle trafficability problems. Brown, R.L., [1981, p.25-38] MP 1474 Near-infrared reflectance of snow-covered substrates. WP 1474 Near-infrared reflectance of snow-covered substrates. Or Brien, H.W., et al., [1981, 17p.] CR 81-21 Vechicle mobility and snowpack parameters. Berger, R.H., [1983, 26p.]	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59- 75] MP 1983. Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al., [1983, p.103-111] Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al., [1983, p.3-18] MP 1754 Snow Symposium, 2nd, 1982. [1983, 295p.] SR 83-04 Snow characterization at SNOW-ONE-B. Berger, R.H., et al., [1983, p.155-195] MP 1847 Snow particle morphology in the seasonal snow cover. Col- beck, S.C., [1983, p.602-609] Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1. [1983, 241p.] SR 83-31 New classification system for the seasonal snow cover. Col- beck, S.C., [1984, p.179-181] MP 1921	p.209-217, Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., (1984, 70p.) CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, G., et al., [1972, p.214-241] MP 887 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al., [1973, p.624-643] MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., [1977, 16 leaves] LANDSAT data. Merry, C.J., et al., [1977, 9, 197-198] MP 1510 Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., [1980, 27p.] SR 80-32 Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478 Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Snow cover characterization. O'Brien, H.W., et al., [1982,
Swinzow, G.K., [1977, 30p.] Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1476 Field investigations of vehicle traction in snow. Harrison, W.L., [1981, p.47-48] Application of energetics to vehicle trafficability problems, Brown, R.L., [1981, p.25-38] MP 1476 Near-infrared reflectance of snow-covered substrates. O'-Brien, H.W., et al, [1981, 17p.] Vechicle mobility and snowpack parameters. Berger, R.H., [1983, 26p.] Progress in methods of measuring the free water content of snow. Fisk, D.J., [1983, p.48-51] MP 1649	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59- 75] MP 1983. Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al, [1983, p.103-111] Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al, [1983, p.3-18] MP 1757 Snow Symposium, 2nd, 1982. [1983, 295p.] SR 83-04 Snow characterization at SNOW-ONE-B. Berger, R.H., et al, [1983, p.155-195] Snow particle morphology in the seasonal snow cover. Col- beck, S.C., [1983, p.602-609] MP 1688 Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1. [1983, 241p.] SR 83-31 New classification system for the seasonal snow cover. Col- beck, S.C., [1984, p.179-181] Performance of microprocessor-controlled snow crystal repli-	p.209-217 ₁ Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., t1984, 70p. ₁ CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep anow. Abele, G., et al., t1972, p.214-241 ₁ MP 887 Mesoscale measurement of anow-cover properties. Bilello, M.A., et al., t1973, p.624-643 ₂ Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., t1977, 16 leaves ₁ MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., t1979, p.197-198 ₁ Now cover mapping in northern Maine using LANDSAT. Merry, C.J., et al., t1979, p.197-198 ₁ Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., t1980, 27p. ₁ SR 80-32 Shallow anow test results. Harrison, W.L., t1981, p.69-71 ₁ MP 1478 Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., t1981, 18p. ₁ SR 81-30 Snow cover characterization. O'Brien, H.W., et al., t1982, p.559-577 ₁ MP 1564
Swinzow, G.K., [1977, 30p.] Snow and snow cover in military science. (1978, p.1-239-1-262) Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] MP 1475 Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1476 Field investigations of vehicle traction in snow. Harrison, W.L., [1981, p.47-48] Application of energetics to vehicle trafficability problems Brown, R.L., [1981, p.25-38] MP 1474 Near-infrared reflectance of snow-covered substrates. O'-Brien, H.W., et al, [1981, 17p.] Vechicle mobility and snowpack parameters. Berger, R.H., [1983, 26p.] Progress in methods of measuring the free water content of snow. Flak, D.J., [1983, p.48-51] MP 1649 Helicopter snow obscuration sub-test. Bersole, J.F., [1984, p.359-376] MP 2094	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59- 75] MP 1983 Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al., [1983, p.103-111] MP 1757 Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al., [1983, p.3-18] MP 1754 Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-04 Snow characterization at SNOW-ONE-B. Berger, R.H., et al., [1983, p.155-195] MP 1847 Snow particle morphology in the seasonal snow cover. Col- beck, S.C., [1984, p.602-609] Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1. [1983, 241p.] SR 83-31 New classification system for the seasonal snow cover. Col- beck, S.C., [1984, p.179-181] Performance of microprocessor-controlled snow crystal repli- cator. Koh, G., [1984, p.107-111] MP 1866	p.209-217, Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., (1984, 70p.) CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, G., et al., [1972, p.214-241] MP 887 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al., [1973, p.624-643] MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., [1977, 16 leaves] LANDSAT data. Merry, C.J., et al., [1977, 9, 197-198] MP 1510 Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., [1980, 27p.] SR 80-32 Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478 Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Snow cover characterization. O'Brien, H.W., et al., [1982,
Swinzow, G.K., [1977, 30p.] Snow and snow cover in military science. Swinzow, G.K., [1978, p.1-239-1-262] Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] MP 1475 Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1476 Application of energetics to vehicle trafficability problems. Brown, R.L., [1981, p.25-38] MP 1476 Application of energetics to vehicle trafficability problems. Brown, R.L., [1981, p.25-38] MP 1476 Near-infrared reflectance of snow-covered substrates. O'-Brien, H.W., et al, [1981, 17p.] Vechicle mobility and snowpack parameters. Berger, R.H., [1983, 26p.] Progress in methods of measuring the free water content of snow. Fisk, D.J., [1983, p.48-51] Helicopter snow obscuration sub-test. Bersole, J.F., [1984, p.359-376] Effects of snow on vehicle-generated seismic signatures. Al-	beck, S.C., [1982, p.4495-4500] MP 1845 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59-75] WF 1983. Visible propagation in falling snow as a function of mass concentration and crystal type. Lacombe, J., et al, [1983, p.103-111] Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al, [1983, p.3-18] MP 1757 Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-84 Snow characterization at SNOW-ONE-B. Berger, R.H., et al, [1983, p.155-195] Snow particle morphology in the seasonal snow cover. Colbeck, S.C., [1983, p.602-609] Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1, [1983, 241p.] SR 83-31 New classification system for the seasonal snow cover. Colbeck, S.C., [1984, p.179-181] Performance of microprocessor-controlled snow crystal replicator. Koh, G., [1984, p.107-111] MP 1866 Approach to snow propagation modeling. Koh, G., [1984, p.247-259] MP 1869	p.209-217] Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., t1984, 70p.] CR 84-22 Snow depth Some effects of air cuahion vehicle operations on deep anow. Abele, G., et al., t1972, p.214-241] MP 887 Mesoscale measurement of anow-cover properties. Bilello, M.A., et al., t1973, p.624-643] MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., t1977, 16 leaves) MP 1113 Snow cover mapping in northern Maine using LANDSAT. Merry, C.J., et al., t1979, p.197-198] MP 1510 Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., t1980, 27p.] SR 80-32 Shallow anow test results. Harrison, W.L., t1981, p.69-71, MP 1478 Predicting wheeled vehicle motion resistance in shallow anow. Blaisdell, G.L., t1981, 18p.; SR 81-30 Snow cover characterization. O'Brien, H.W., et al., t1982, p.559-577, MP 1864 Northwest snowstorm of 15-16 December 1981. Bates, R.E., t1983, p.19-34; MP 1755 Orowth of black ice, snow ice and snow thickness, subarctic
Swinzow, G.K., [1977, 30p.] Snow and snow cover in military science. (1978, p.1-239-1-262) Prediction methods for vehicle traction on snow. Harrison, W.L., [1981, p.39-46] MP 1475 Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1476 Field investigations of vehicle traction in snow. Harrison, W.L., [1981, p.47-48] Application of energetics to vehicle trafficability problems Brown, R.L., [1981, p.25-38] MP 1474 Near-infrared reflectance of snow-covered substrates. O'-Brien, H.W., et al, [1981, 17p.] Vechicle mobility and snowpack parameters. Berger, R.H., [1983, 26p.] Progress in methods of measuring the free water content of snow. Flak, D.J., [1983, p.48-51] MP 1649 Helicopter snow obscuration sub-test. Bersole, J.F., [1984, p.359-376] MP 2094	beck, S.C., [1982, p.4495-4500] MP 1545 Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bitello, M.A., [1982, p.59- 75] MP 1983. Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al., [1983, p.103-111] MP 1757 Atmospheric conditions and snow crystal observations during SNOW-ONE-A. Bilello, M.A., et al., [1983, p.3-18] MP 1754 Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-04 Snow characterization at SNOW-ONE-B. Berger, R.H., et al., [1983, p.155-195] MP 1688 Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1. [1983, 241p.] New classification system for the seasonal snow cover. Col- beck, S.C., [1984, p.179-181] MP 1921 Performance of microprocessor-controlled snow crystal repli- cator. Koh, G., [1984, p.107-111] MP 1866 Approach to snow propagation modeling. Koh, G., [1984,	p.209-217, Regional and seasonal variations in snow-cover density in the U.S.S.R. Bilello, M.A., (1984, 70p.) CR 84-22 Snow depth Some effects of air cushion vehicle operations on deep snow. Abele, G., et al., [1972, p.214-241] MP 887 Mesoscale measurement of snow-cover properties. Bilello, M.A., et al., [1973, p.624-643] MP 1029 Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., [1977, 16 leaves] MP 1113 Snow cover mapping in northern Maine using LANDSAT. Merry, C.J., et al., [1977, p.197-198] MP 1510 Ice characteristics in Whitefish Bay and St. Marys River in winter. Vance, G.P., [1980, 27p.] SR 80-32 Shallow snow test results. Harrison, W.L., [1981, p.69-71] Predicting wheeled vehicle motion resistance in shallow snow. Blaisdell, G.L., [1981, 18p.] SR 81-30 Snow cover characterization. O'Brien, H.W., et al., [1982, p.559-577] Northwest snowstorm of 15-16 December 1981. Bates, R.E., [1983, p.19-34]

Snow elasticity	Thellow areas and common of wheeled auchistan Hamisen	Discrete reflections from thin layers of snow and ice. Jezek,
Review of the propagation of inelastic pressure waves in snow.	Shallow snow performance of wheeled vehicles. Harrison, W.L., [1976, p.589-614] MP 1130	K.C., et al. [1984, p.323-331] MP 1871
Athert, D.G., (1983, 26p.) CR 83-13 Snow electrical properties	Study of piles installed in polar anow. Kovacs, A., 1976, 132p.; CR 76-23	Overview of meteorological and snow cover characterization at SNOW-TWO. Bates, R.E., et al, [1984, p.171-191]
Engineering properties of snow. Mellor, M., [1977, p.15-	Ice and snow at high altitudes. Mellor, M., [1977, 10p.]	MP 1868
66 ₁ MP 1015 Dielectric constant and reflection coefficient of snow surface	MP 1121 Engineering properties of snow. Meilor, M., (1977, p.15-	Experiments on thermal convection in snow. Powers, D., et al, [1985, p.43-47] MIP 2006
layers in the McMurdo Ice Shelf. Kovacs, A., et al, [1977,	66 ₁ MP 1015	Climatic factors in cold regions surface conditions. Bilello,
p.137-138 ₃ MP 1011 Liquid distribution and the dielectric constant of wet snow.	Axial double point-load tests on snow and ice. Kovacs, A., [1978, 11p.] CR 78-01	M.A., [1985, p.508-517] MP 1961 Theory of natural convection in snow. Powers, D., et al,
Colbeck, S.C., [1980, p.21-39] MP 1349	Sintering and compaction of snow containing liquid water.	[1985, p.10,641-10,649] MP 1957
Geometry and permittivity of snow at high frequencies. Col- beck, S.C., [1982, p.4495-4500] MP 1545	Colbeck, S.C., et al, [1979, p.13-32] MP 1190 Volumetric constitutive law for snow. Brown, R.L., [1980,	Snow removal Computer model of municipal snow removal. Tucker, W.B.,
Geometry and permittivity of snow. Colbeck, S.C., [1982,	p.161-165 ₁ MP 1803	[1977, 7p.] CIR 77-36
p.113-131; MP 1965 Progress in methods of measuring the free water content of	Analysis of non-steady plastic shock waves in snow. Brown, R.L., [1980, p.279-287] MP 1354	Current research on anow and ice removal in the United States. Minsk, L.D., [1978, p.21-22] MP 1199
snow. Fisk, D.J., [1983, p.48-51] MP 1649	Workshop on snow traction mechanics, 1979. Harrison,	Computer simulation of urban snow removal. Tucker, W.B.,
Use of radio frequency sensor for snow/soil moisture water content measurement. McKim, H.L., et al, [1983, p.33-	W.L., ed, [1981, 71p.] SR 81-16 Modelling a snowdrift by means of activated clay particles.	et al, [1979, p.293-302] MP 1238 Compaction of wet snow on highways. Colbeck, S.C.,
42 ₁ MP 1689	Anno, Y., (1985, p.48-52) MP 2007	[1979, p.14-17] MP 1234
Snow-cover characterization: SADARM support. O'Brien, H., et al, (1984, p.409-411) MP 2095	Snow melting Spread of cetyl-1-C14 alcohol on a melting snow surface.	Systems study of snow removal. Minsk, L.D., [1979, p.220- 225] MP 1237
Dielectric measurements of snow cover. Burns, B.A., et al., r1985, p.829-8341 MP 1913	Meiman, J.R., et al, [1966, p.5-8] MP 876	Snow removal equipment. Minsk, L.D., (1981, p.648-670)
[1985, p.829-834] MP 1913 Snow funces	Short-term forecasting of water run-off from snow and ice. Colbeck, S.C., [1977, p.571-588] MP 1067	MP 1446 Snow and ice control on railroads, highways and airports.
Computer simulation of the snowmelt and soil thermal regime	Permeability of a melting snow cover. Colbeck, S.C., et al,	Minsk, L.D., et al, [1981, p.671-706] MP 1447
at Barrow, Alaska. Outcalt, S.I., et al, [1975, p.709-715] MP 857	[1982, p.904-908] MP 1565 Free water measurements of a snowpack. Fisk, D.J., [1983,	Strategies for winter maintenance of pavements and road- ways. Minsk, L.D., et al, [1984, p.155-167]
Snowdrift control at ILS facilities in Alaska. Calkins, D.J.,	p.173-176 ₁ MP 1758	MP 1964
(1976, 41p.) MP 914 Hydraulic model investigation of drifting snow. Wuebben,	Snow morphology	Snow and ice prevention in the United States. Minsk, L.D., [1986, p.37-42] MIP 1874
J.L., [1978, 29p.] CR 78-16	Snow particle morphology in the seasonal snow cover. Colbeck, S.C., [1983, p.602-609] MP 1688	Snow roads
Snow hardness Snow cover characterization. O'Brien, H.W., et al, [1982,	Snow optics	Mechanical properties of snow used as construction material. Wuori, A.F., (1975, p.157-164) MP 1957
p.559-577 ₃ MP 1564	Red and near-infrared spectral reflectance of snow. O'Brien, H.W., et al, [1975, p.345-360] MP 872	The strength of natural and processed snow. Abele, G.,
Snow heat flux Increased heat flow due to snow compaction: the simplistic	Engineering properties of snow. Mellor, M., [1977, p.15-	[1975, p.176-186] MP 1058 Surface protection measures for the Arctic Slope, Alaska.
approach. Cofbeck, S.C., [1983, p.227-229]	66 ₁ MP 1015 Observations of the ultraviolet spectral reflectance of snow.	Johnson, P.R., [1978, p.202-205] MIP 1519
MP 1693 Thermal convection in snow. Powers, D.J., et al, [1985,	O'Brien, H.W., [1977, 19p.] CR 77-27	Snow and ice roads in the Arctic. Johnson, P.R., [1979, p.1063-1071] MP 1223
61p. ₁ CR 85-09	Snowpack optical properties in the infrared. Berger, R.H., [1979, 16p.] CR 79-11	Snow pads for pipeline construction in Alaska. Johnson,
Snow hydrology Effects of radiation penetration on snowmelt runoff hydro-	Snow crystal habit. Koh, G., et al, [1982, p.181-216]	P.R., et al, [1980, 28p.] CR 80-17
graphs. Colbeck, S.C., [1976, 9p.] CR 76-11	MP 1561 Snow Symposium, 1st, Hanover, NH, Aug. 1981, 1982,	Snow samplers New 2 and 3 inch diameter CRREL snow samplers. Bates,
On the use of tensiometers in snow hydrology. Colbeck, S.C., [1976, p.135-140] MP 843	324p. ₁ SR 82-17	R.E., et al, [1980, p.199-200] MIP 1430
Energy balance and runoff from a subarctic anowpack.	Problems in snow cover characterization. O'Brien, H.W., [1982, p.139-147] MP 1987	Snow stratigraphy Water flow through heterogeneous snow. Colbeck, S.C.,
Price, A.G., et al, [1976, 29p.] CR 76-27 Short-term forecasting of water run-off from snow and ice.	Visible propagation in falling snow as a function of mass con-	[1979, p.37-45] MP 1219
Colbeck, S.C., [1977, p.571-588] MP 1067	centration and crystal type. Lacombe, J., et al, [1983, p.103-111] MP 1757	Snow strength Instrument for determining snow properties related to traffi-
Physical aspects of water flow through snow. Colbeck, S.C., [1978, p.165-206] MP 1566	Performance and optical signature of an AN/VVS-1 laser	cability. Parrott, W.H., et al, [1972, p.193-204]
Snow, ice and frozen ground research at the Sleepers River,	rangefinder in falling snow: Preliminary test results. Lacombe, J., [1983, p.253-266] MP 1759	Effect of temperature on the strength of snow-ice. Haynes,
VT. Pangburn, T., et al, [1984, p.229-240] MP 2071	Atmospheric conditions and snow crystal observations during	F.D., [1978, 25p.] CR 78-27
Snow ice	SNOW-ONE-A. Bilello, M.A., et al, [1983, p.3-18] MP 1754	Snow studies associated with the sideways move of DYE-3. Tobiasson. W., [1979, p.117-124] MIP 1312
Growth of black ice, snow ice and snow thickness, subarctic basins. Leppäranta, M., (1983, p.59-70) MP 2063	Chemical obscurant tests during winter: Environmental fate. Cragin, J.H., [1983, p.267-272] MP 1760	Pressure waves in snow. Brown, R.L., [1980, p.99-107] MP 1306
Snow impurities	Snow Symposium, 2nd, 1982. [1983, 295p.] SR 83-04	Snow fortifications as protection against shaped charge an-
Engineering properties of snow. Mellor, M., [1977, p.15-66] MP 1015	Utilization of the snow field test series results for development	titank projectiles. Farrell, D.R., [1980, 19p.] SR 36-11
Atmospheric pollutants in snow cover runoff. Colbeck, S.C.,	of a snow obscuration primer. Ebersole, J.F., et al, 1983, p.209-217; MP 1692	Extending the useful life of DYE-2 to 1986. Tobiasson, W.,
[1981, p.1-10] MP 1586 Atmospheric pollutants in snow cover runoff. Colbeck, S.C.,	Snow-cover characterization: SADARM support. O'Brien, H., et al, (1984, p.409-411) MP 2095	et al, [1980, 37p.] SR 80-13 Snow pads for pipeline construction in Alaska. Johnson,
[1981, p.1383-1388] MP 1487	Snow permeability	P.R., et al, [1980, 28p.] CR 80-17
Nitrate fluctuations in antarctic snow and firm. Parker, B.C., et al, (1982, p.243-248) MP 1551	Spread of cetyl-1-C14 alcohol on a melting snow surface. Meiman, J.R., et al, [1966, p.5-8] MP 876	Investigation of the snow adjacent to Dye-2, Greenland. Ueda, H.T., et al, [1981, 23p.] SR 81-03
Snow loads Snow load design criteria for the United States. Tobiasson,	Water percolation through homogeneous snow. Colbeck,	Prediction methods for vehicle traction on snow. Harrison,
Snow load design criteria for the United States. Tobiasson, W., et al, [1976, p.70-72] MP 947	S.C., et al, [1973, p.242-257] MP 1025 Analysis of water flow in dry snow. Colbeck, S.C., [1976,	W.L., 1981, p.39-46; MP 1475 Vehicle tests and performance in snow. Berger, R.H., et al,
Update on snow load research at CRREL. Tobiasson, W., et al, [1977, p.9-13] MP 1142	p.523-527 ₁ MP 871	[1981, p.51-67] MP 1477
Methodology used in generation of snow load case histories.		
Mediodology also in Benefitation of show tout case instortes.	Physical aspects of water flow through snow. Colbeck, S.C., 1978, p. 165-206.	Snow surface
McLaughlin, D., et al, [1977, p.163-174] MP 1143	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al,	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, [1966, p.5-8] MP 876
McLaughlin, D., et al, [1977, p.163-174] MP 1143 Roof loads resulting from rain-on-anow. Colbeck, S.C., [1977, 19p.] CR 77-12	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al, [1982, p.904-908] MP 1565	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al., 1966, p.5-8; Dielectric constant and reflection coefficient of anow surface.
McLaughlin, D., et al., [1977, p.163-174] MP 1143 Roof loads resulting from rain-on-anow. (1977, 19p.) Roof loads resulting from rain on anow. Colbeck, S.C.,	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al, [1982, p.904-908] MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.]	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, 1966, p.5-8 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al, 1977, p.137-138 MP 1011
McLaughlin, D., et al., 1977, p.163-174; MP 1143 Roof loads resulting from rain-on-anow. Colbeck, S.C., CR 77-12 Roof loads resulting from rain on anow. Colbeck, S.C., L1977, p.482-490; MP 982 Snow loads on structures. O'Rourke, M.J., [1978, p.418-	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al, [1982, p.904-908] MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.] MP 1221	Snow surface Spread of cetyl-1-C14 sloohol on a melting snow surface. Meiman, J.R., et al, [1966, p.5-8] MP 276 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al, [1977, p.137-138] MP 1011 Measurement of snow surfaces and tire performance evalua-
McLaughlin, D., et al., [1977, p.163-174] MP 1143 Roof loads resulting from rain-on-snow. [1977, 19p.] Roof loads resulting from rain on snow. [1977, p.482-490] MP 982 Snow loads on structures. O'Rourke, M.J., [1978, p.418-MP 1801]	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al, [1982, p.904-908] MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.]	Saow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, 1966, p.5-8 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo loc Shelf. Kovacs, A., et al, 1977, p.137-138 MP 1011 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, 1982, 7p. MP 1516 Chemical obscurant tests during winter; environmental fate.
McLaughlin, D., et al., 1977, p.163-174; MP 1143 Roof loads resulting from rain-on-anow. Colbeck, S.C., CR 77-12 Roof loads resulting from rain on snow. Colbeck, S.C., L1977, p.482-490; MP 982 Snow loads on structures. O'Rourke, M.J., [1978, p.418-428] Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.) SR 75-09	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al, (1982, p.904-908) MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.] MP 1221 Grain clusters in wet snow. Colbeck, S.C., [1979, p.371-384] Propagation of stress waves in alpine snow. Brown, R.L.,	Snow surface Spread of cetyl-1-C14 sloohol on a melting snow surface. Meiman, J.R., et al, [1966, p.5-8] MP 276 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al, [1977, p.137-138] MP 1011 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., [1982, 9p.] SR 22-19
McLaughlin, D., et al., 1977, p.163-174; MP 1143 Roof loads resulting from rain-on-anow. Colbeck, S.C., CR 77-12 Roof loads resulting from rain on anow. Colbeck, S.C., MP 982 Snow loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., [1979, 32p.] New 2 and 3 inch diameter CREL snow samplers. Bates,	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al, [1982, p.904-908] MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.) MP 1121 Grain clusters in wet snow. Colbeck, S.C., [1979, p.371-384] Propagation of stress waves in alpine snow. Brown, R.L., [1980, p.235-243] Overview of seasonal snow metamorphism. Colbeck, S.C.,	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, 1966, p.5-8 ₁ MP 876 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo loc Shelf. Kovacs, A., et al, 1977, p.137-138 ₁ MP 1011 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, 1982, 7p. ₁ MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., (1982, 9p.) Firn quake (a rare and poorly explained phenomenon). Den-Hartog, S.L., [1982, p.173-174 ₁ MP 1871
McLaughlin, D., et al., 1977, p.163-174; MP 1143 Roof loads resulting from rain-on-anow. Colbeck, S.C., (1977, 19p.) CR 77-12 Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) Snow loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., (1979, 32p.) SR 75-09 New 2 and 3 inch diameter CRREL snow samplers. Bates, E., et al., (1980, p.199-200) Impact fuse performance in snow (Initial evaluation of a new	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al, (1982, p.904-908) MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.] MP 121 Grain clusters in wet snow. Colbeck, S.C., [1979, p.371-384] Propagation of stress waves in alpine snow. [1970, p.352-243] Overview of seasonal snow metamorphism. Colbeck, S.C., [1982, p.45-61]	Snow surface Spread of cetyi-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, t1966, p.5-8; MP 276 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo loc Shelf. Kovacs, A., et al, t1977, p.137-138; MP 1011 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, t1982, 7p.; MP 1316 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., t1982, 9p.; SR 22-19 Firn quake (a rare and poorly explained phenomenon). Den- Hartog, S.L., t1982, p.173-174; MP 1571 Snow surface temperature
McLaughlin, D., et al., 1977, p.163-174, MP 1143 Roof loads resulting from rain-on-anow. (1977, 19p.) Colbeck, S.C., CR 77-12 Roof loads resulting from rain on snow. (1977, p.482-490) Snow loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., (1979, 32p.) New 2 and 3 inch diameter CRREL anow samplers. Bates, R.E., et al., (1980, p.199-200) MP 1430	r 1978, p. 165-2067 MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al., r 1982, p. 904-908 MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. r 1977, 10p., MP 1121 Grain clusters in wet snow. Colbeck, S.C., r 1979, p. 371-384; MP 1267 Propagation of stress waves in alpine snow. r 1980, p. 235-243; MP 1367 Overview of seasonal snow metamorphism. Colbeck, S.C., r 1982, p. 45-61; MP 1500 Geometry and permittivity of snow. Colbeck, S.C., r 1982, p. 113-131; MP 1985	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, 1966, p.5-8 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo loe Shelf. Kovacs, A., et al, 1977, p.137-138 MP 1911 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, 1982, 7p.] MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., (1982, 9p.) Sk 82-19 Firn quake (a rare and poorty explained phenomenon). Den- Hartog, S.L., [1982, p.173-174] MP 1871 Snow surface temperature New method for measuring the snow-surface temperature. Andreas, E.L., [1984, p.161-169) MP 1867
McLaughlin, D., et al., 11977, p.163-174; MP 1143 Roof loads resulting from rain-on-anow. Colbeck, S.C., (1977, 19p.) CR 77-12 Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) Colbeck, S.C., MP 982 Snow loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., (1979, 32p.) SR 75-09 New 2 and 3 inch diameter CRREL snow samplers. Bates, et al., (1980, p.199-200) MP 1430 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45, MP 1347 Uniform snow loads on structures. O'Rourke, M.J., et al.,	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al. (1982, p.904-908) MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.] MP 1221 Grain clusters in wet snow. Colbeck, S.C., [1979, p.371-384] Propagation of stress waves in alpine snow. [1979, p.371-384] Overview of seasonal snow metamorphism. Colbeck, S.C., [1982, p.413-131] Geometry and permittivity of snow. Colbeck, S.C., [1982, p.113-131] Problems in snow cover characterization. O'Brien, H.W.,	Snow surface Spread of cetyi-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, [1966, p.5-8] MP 276 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo loc Shelf. Kovacs, A., et al, [1977, p.137-138] MP 1011 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., [1982, 9p.] Firn quake (a rare and poorly explained phenomenon). Den- Hartog, S.L., [1982, p.173-174] Snow surface temperature New method for measuring the snow-surface temperature. Andreas, E.L., [1984, p.161-169) MP 1867 Snow surray tools
McLaughlin, D., et al, 1977, p.163-174, Roof loads resulting from rain-on-anow. Colbeck, S.C., (1977, 19p.) Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) Snow loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al, [1979, 32p.) New 2 and 3 inch diameter CRREL snow samplers. Bates, R.E., et al, [1980, p.199-200) MP 1430 Impact fuse performance in snow (Initial evaluation of a new test technique). Aithen, G.W., et al, [1980, p.31-45] MP 1347 Uniform snow loads on structures. O'Rourke, M.J., et al, (1982, p.2781-2798) Ground snow loads for structural design. Ellingwood, B., et	c1978, p.165-2067 MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al. c1982, p.904-9087 MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. c1977, 10p., MP 121 Grain clusters in wet snow. Colbeck, S.C., [1979, p.371- 384] MP 1267 Propagation of stress waves in alpine snow. c1980, p.235-2437 Overview of seasonal snow metamorphism. Colbeck, S.C., c1982, p.45-61] MP 1367 Geometry and permittivity of snow. Colbeck, S.C., c1982, p.113-131] Problems in snow cover characterization. c1982, p.139-147] Workshop on the Properties of Snow, 1981. Brown, R.L., ed.,	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, 1966, p.5-8 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo loc Shelf. Kovacs, A., et al, 1977, p.137-138 MP 1911 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, 1982, 7p.] MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., (1982, 9p.) SR 82-19 Firn quake (a rare and poorly explained phenomenon). Denhartog, S.L., [1982, p.173-174] MP 1871 Snow surface temperature New method for measuring the snow-surface temperature. Andreas, B.L., [1984, p.161-169) MP 1867 Snow survey tools Snowpack profile analysis using extracted thin sections. SR 82-11
McLaughlin, D., et al, 1977, p.163-174, MP 1143 Roof loads resulting from rain-on-anow. Colbeck, S.C., (1977, 19p.) Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) Snow loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redifield, R., et al, (1979, 32p.) New 2 and 3 inch diameter CRREL snow samplers. Bates, R.E., et al, (1980, p.199-200) MP 1430 Impact fixe performance in snow (Initial evaluation of a new test technique). Aithen, G.W., et al, (1980, p.31-45) Uniform snow loads on structures. O'Rourke, M.J., et al, (1982, p.2781-2798) Ground snow loads for structural design. Ellingwood, B., et al, (1983, p.950-964) MP 1734	t 1978, p. 165-2067 Permeability of a melting snow cover. Colbeck, S.C., et al. (1982, p. 904-908) MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.] MP 1221 Grain clusters in wet snow. Colbeck, S.C., [1979, p. 371-384] Propagation of stress waves in alpine snow. [1980, p. 235-243] Overview of seasonal snow metamorphism. Colbeck, S.C., [MP 1367 Overview of seasonal snow metamorphism. [1982, p. 131-131] Problems in snow cover characterization. [1982, p. 139-147] Wortshop on the Properties of Snow, 1981. Brown, R.L., ed. [1982, 135p.]	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, [1966, p.5-8] MP 876 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al, [1977, p.137-138] Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1011 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, [1982, 7p.] MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., [1982, 9p.] SR 82-19 Firn quake (a rare and poorly explained phenomenon). Den-Hartog, S.L., [1982, p.173-174] New method for measuring the snow-surface temperature. Andreas, E.L., [1984, p.161-169] Snow surface. Snowpack profile analysis using extracted thin sections. Harrison, W.L., [1982, 15p.] SR 82-11 Snow surveys
McLaughlin, D., et al., 1977, p.163-174, Roof loads resulting from rain-on-anow. Colbeck, S.C., (1977, 19p.) Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) Snow loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., (1979, 32p.) New 2 and 3 inch diameter CRREL snow samplers. Bates, R.B., et al., (1980, p.199-200) MP 1430 Impact fuse performance in snow (Initial evaluation of a new test technique). Aithen, G.W., et al., (1980, p.31-45) MP 1347 Uniform snow loads on structures. O'Rourke, M.J., et al., (1982, p.2781-2798) Ground snow loads for structural design. Ellingwood, B., et al., (1983, p.950-964) Atmospheric icing of structures. Minsk, L.D., ed., (1983, 366p.) SR 83-17	c1978, p.165-206p MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al, (1982, p.904-908) MP 1565 Snow physics lee and snow at high altitudes. Mellor, M. [1977, 10p., MP 121] Grain clusters in wet snow. Colbeck, S.C., [1979, p.371-384] MP 1267 Propagation of stress waves in alpine snow. [1980, p.235-243] MP 1267 Overview of seasonal snow metamorphism. Colbeck, S.C., [1982, p.45-61] MP 1500 Geometry and permittivity of snow. Colbeck, S.C., [1982, p.113-131] MP 1985 Problems in snow cover characterization. [1982, p.139-147] MP 1987 Workshop on the Properties of Snow, 1981. Brown, R.L., ed, (1982, 135p.) Snow Symposium, 2nd, 1982, [1983, 295p.] SR 82-08 Comparative near-milllimeter wave propagation properties of	Snow surface Spread of cetyl-1-C14 alcohol on a melting snow surface. Meiman, J.R., et al, 1966, p.5-8 MP 876 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo loc Shelf. Kovacs, A., et al, 1977, p.137-138 MP 1011 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, 1982, 7p.) MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., (1982, 9p.) Firn quake (a rare and poorly explained phenomenon). Denhartog, S.L., [1982, p.173-174] MP 1871 Snow surface temperature New method for measuring the snow-surface temperature. Andreas, B.L., [1984, p.161-169] Snowpack profile analysis using extracted thin sections. Harrison, W.L., (1982, 15p.) SR 82-11 Snow surveys Snow and ice. Colbeck, S.C., et al, (1975, p.435-441, 475-487) MP 844
McLaughlin, D., et al., 1977, p.163-174, Molada resulting from rain-on-anow. (1977, 19p.) Roof loads resulting from rain-on-anow. (1977, 19p.) Roof loads resulting from rain on snow. (1977, p.482-490) Snow loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., (1979, 32p.) New 2 and 3 inch diameter CRREL snow samplers. Bates, R.E., et al., (1980, p.199-200) Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-454) Uniform snow loads on structures. O'Rourke, M.J., et al., (1982, p.2781-2798) Ground snow loads for structural design. Billingwood, B., et al., (1983, p.950-964) Atmospheric icing of structures. Minsk, L.D., ed., (1983, 366p.) SR 83-17 Probability models for annual extreme water-equivalent	c1978, p.165-2067 Permeability of a melting snow cover. Colbeck, S.C., et al. (1982, p.904-908) MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.] MP 1221 Grain clusters in wet snow. Colbeck, S.C., [1979, p.371-384] Propagation of stress waves in alpine snow. [1970, p.371-384] Overview of seasonal snow metamorphism. Colbeck, S.C., [MP 1367 Overview of seasonal snow metamorphism. [1982, p.45-61] Geometry and permittivity of snow. Colbeck, S.C., [1982, p.113-131] Problems in snow cover characterization. [1982, p.139-147] Workshop on the Properties of Snow, 1981. [1980, R.L., ed. (1982, 135p.] Snow Symposium, 2nd, 1982, [1983, 295p.] SR 83-04 Comparative near-millimeter wave propagation properties of snow or rain. Nemarich, J., et al., [1983, p.115-129]	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, (1966, p.5-8) MP 876 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al, (1977, p.137-138) Messurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, (1982, 7p.) MP 1916 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., (1982, 9p.) Pirm quake (a rare and poorly explained phenomenon). Den-Hartog, S.L., (1982, p.173-174) Snow surface temperature New method for measuring the snow-surface temperature. Andreas, E.L., (1984, p.161-169) Snow survey tools Snowpack profile analysis using extracted thin sections. Harrison, W.L., (1982, 15p.) Snow surveys Snow and ice. Colbeck, S.C., et al, (1975, p.435-441, 475-487) Catalog of Snow Research Projects. (1975, 103p.)
McLaughlin, D., et al, 1977, p.163-174, Roof loads resulting from rain-on-anow. Colbeck, S.C., (1977, 19p.) Roof loads resulting from rain on snow. Colbeck, S.C., (1977, p.482-490) Snow loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al, (1979, 32p.) New 2 and 3 inch diameter CRREL anow samplers. Bates, R.E., et al, (1980, p.199-200) MP 1430 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al, (1980, p.31-45) MP 1347 Uniform snow loads on structures. O'Rourke, M.J., et al, (1982, p.2781-2798) Ground snow loads for structural design. Ellingwood, B., et al, (1983, p.950-964) Atmospheric icing of structures. Minsk, L.D., ed, (1983, 366p.) SR 83-17 Probability models for annual extreme water-equivalent ground snow. Ellingwood, B., et al, (1984, p.1153-1159) MP 1833	c1978, p.165-206p MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al. (1982, p.904-908) MP 1565 Snow physics lee and snow at high altitudes. Mellor, M. [1977, 10p., MP 121] Grain clusters in wet snow. Colbeck, S.C., [1979, p.37]- 384] MP 1267 Propagation of stress waves in alpine snow. [1980, p.235-243] MP 1267 Overview of seasonal snow metamorphism. Colbeck, S.C., [1982, p.45-61] MP 1500 Geometry and permittivity of snow. Colbeck, S.C., [1982, p.113-131] MP 1985 Problems in snow cover characterization. [1982, p.139-147] MP 1985 Workshop on the Properties of Snow, 1981. Brown, R.L., ed. (1982, 135p.) Snow Symposium, 2nd, 1982. [1983, 295p.] SR 82-18 Snow Symposium, 2nd, 1982. [1983, 295p.] SR 83-04 Comparative near-millimeter wave propagation properties of snow or rain. Nemarich, J., et al. [1983, p.115-129, MP 1690 Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1.	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, 1966, p.5-8 MP 876 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo loc Shelf. Kovacs, A., et al, 1977, p.137-138 MP 1011 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, 1982, 7p.] MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., (1982, 9p.) SR 82-19 Firn quake (a rare and poorly explained phenomenon). Denhartog, S.L., [1982, p.173-174] MP 1871 Snow surface temperature New method for measuring the snow-surface temperature. Andreas, B.L., [1984, p.161-169] MP 1867 Snow surveys Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] MP 844 Catalog of Snow Research Projects. [1975, 103p.] MP 1129 Notes and quotes from snow and ice observers in Alsaka.
McLaughlin, D., et al, 1977, p.163-174, Roof loads resulting from rain-on-anow. (1977, 19p.) Roof loads resulting from rain on anow. (1977, 19p.) Roof loads resulting from rain on anow. (1977, 19p.) Roof loads resulting from rain on anow. (20 beck, S.C., (1977, 19p.) MP 962 Snow loads on structures. O'Rourke, M.J., (1978, p.418- MP 1801 Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al, (1979, 32p.) New 2 and 3 inch diameter CRREL anow samplers. R.E., et al, (1980, p.199-200) MP 1430 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al, (1980, p.31-45) MP 1347 Uniform snow loads on structures. O'Rourke, M.J., et al, (1982, p.2781-2798) Ground snow loads for structural design. Billingwood, B., et al, (1983, p.350-964) Atmospheric icing of structures. Minsk, L.D., ed, (1983, 366p.) SR 83-17 Probability models for annual extreme water-equivalent ground snow. Billingwood, B., et al, (1984, p.1153-1159)	[1978, p.165-206] MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al. [1982, p.904-908] MP 1565 Snow physics Ice and snow at high altitudes. Mellor, M. [1977, 10p.) MP 1121 Grain clusters in wet snow. Colbeck, S.C., [1979, p.371- 384] MP 1267 Propagation of stress waves in alpine snow. Brown, R.L., [1980, p.235-243] MP 1267 Overview of seasonal snow metamorphism. Colbeck, S.C., [1982, p.45-61] Geometry and permittivity of snow. Colbeck, S.C., [1982, p.113-131] Problems in snow cover characterization. [1982, p.139-147] Workshop on the Properties of Snow, 1981. Brown, R.L., ed., [1982, p.139-147] SR 83-304 Comparative near-millimeter wave propagation properties of snow or rain. Nemarich, J., et al., [1983, p.115-129] MP 1690 Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1. [1983, 241p.] SR 83-31	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, (1966, p.5-8) Dielectric constant and reflection coefficient of snow surface layers in the McMurdo Ice Shelf. Kovacs, A., et al, (1977, p.137-138) MP 1011 Measurement of snow surfaces and tire performance evaluation. Bliadell, G.L., et al, (1982, 7p.) MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., (1982, 9p.) SR 22-19 Firn quake (a rare and poorly explained phenomenon). Dentartog, S.L., (1982, p.173-174) Snow surface temperature New method for measuring the snow-surface temperature. Andreas, E.L., (1984, p.161-169) Snow survey tools Snow and ice. Colbeck, S.C., et al, (1975, p.435-441, 475-487) Catalog of Snow Research Projects. (1975, 103p.) MP 1129 Notes and quotes from snow and ice observers in Alaska. Bilello, M.A., (1979, p.116-118) MP 1826
McLaughlin, D., et al., 1977, p.163-174, Molada resulting from rain-on-anow. (1977, 19p.) Roof loads resulting from rain on snow. (1977, 19p.) Roof loads resulting from rain on snow. (1977, 19p.) Roof loads resulting from rain on snow. (1977, 19p.) Scott loads on structures. O'Rourke, M.J., (1978, p.418-428) Loading on the Hartford Civic Center roof before collapse. Redfield, R., et al., (1979, 32p.) New 2 and 3 inch diameter CRREL snow samplers. R.E., et al., (1980, p.199-200) MP 1430 Impact fuse performance in snow (Initial evaluation of a new test technique). Aitken, G.W., et al., (1980, p.31-45, MP 1347 Uniform snow loads on structures. O'Rourke, M.J., et al., (1982, p.2781-2798) Ground snow loads for structural design. Ellingwood, B., et al., (1983, p.950-964) Atmospheric icing of structures. Minsk, L.D., ed., (1983, 366p.) Rodelingwood, B., et al., (1984, p.1153-1159) MP 1523 Secondary stress within the structural frame of D'RE-3: 1978-	c1978, p.165-206p MP 1566 Permeability of a melting snow cover. Colbeck, S.C., et al. (1982, p.904-908) MP 1565 Snow physics lee and snow at high altitudes. Mellor, M. [1977, 10p., MP 121] Grain clusters in wet snow. Colbeck, S.C., [1979, p.37]- 384] MP 1267 Propagation of stress waves in alpine snow. [1980, p.235-243] MP 1267 Overview of seasonal snow metamorphism. Colbeck, S.C., [1982, p.45-61] MP 1500 Geometry and permittivity of snow. Colbeck, S.C., [1982, p.113-131] MP 1985 Problems in snow cover characterization. [1982, p.139-147] MP 1985 Workshop on the Properties of Snow, 1981. Brown, R.L., ed. (1982, 135p.) Snow Symposium, 2nd, 1982. [1983, 295p.] SR 82-18 Snow Symposium, 2nd, 1982. [1983, 295p.] SR 83-04 Comparative near-millimeter wave propagation properties of snow or rain. Nemarich, J., et al. [1983, p.115-129, MP 1690 Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1.	Snow surface Spread of cetyl-1-C14 alcohol on a melting anow surface. Meiman, J.R., et al, 1966, p.5-8 MP 876 Dielectric constant and reflection coefficient of snow surface layers in the McMurdo loc Shelf. Kovacs, A., et al, 1977, p.137-138 MP 1011 Measurement of snow surfaces and tire performance evaluation. Blaisdell, G.L., et al, 1982, 7p.] MP 1516 Chemical obscurant tests during winter; environmental fate. Cragin, J.H., (1982, 9p.) Firn quake (a rare and poorly explained phenomenon). Denhartog, S.L., [1982, p.173-174] New method for measuring the snow-surface temperature. Andreas, B.L., [1984, p.161-169] Snow survey tools Snowpack profile analysis using extracted thin sections. Harrison, W.L., (1982, 15p.) SR 82-11 Snow surveys Snow and ice. Colbeck, S.C., et al, [1975, p.435-441, 475-487] MP 244 Catalog of Snow Research Projects. [1975, 103p.] MP 1129 Notes and quotes from snow and ice observers in Alsaka.

Snow Symposium, 1st, Hanover, NH, Aug. 1981. [1982, 324p.] SR 82-17 Workshop on the Properties of Snow, 1981. Brown, R.L., ed,	Probability models for annual extreme water-equivalent ground snow. Ellingwood, B., et al, [1984, p.1153-1159] MP 1823	Wavelength-dependent extinction by falling snow. Koh, G., (1986, p.51-55) MP 2019 Snewfishes
(1982, 135p.) SR 82-18 Bibliography on glaciers and permafrost, China, 1938-1979.	Snow, ice and frozen ground research at the Sleepers River, VT. Pangburn, T., et al, [1984, p.229-240]	Airborne snow and fog distributions. Berger, R.H., (1982, p.217-223)
Shen, J., ed, [1982, 44p.] SR 82-20 Proceedings of the Symposium on Applied Glaciology, 2nd,	MP 2071 Snowdrifts	SNOW-ONE-A; Data report. Aitken, G.W., ed, (1982, 641p.)
1982. (1983, 314p.) MP 2654 Snow cover and meteorology at Allagash, Maine, 1977-1980.	Snowdrift control at ILS facilities in Alaska. Calkins, D.J., [1976, 41p.] MP 914	Snow crystal habit. Koh, G., et al, [1982, p.181-216] MP 1561
Regional and seasonal variations in snow-cover density in the	Surface protection measures for the Arctic Slope, Alaska- Johnson, P.R., {1978, p.202-205 ₁ MP 1519	Measurements of airborne-anow concentration. Lacombe, J., [1982, p.225-281] MP 1563
U.S.S.R. Bilello, M.A., [1984, 70p.] CR 84-22 Topical databases: Cold Regions Technology on-line. Lis-	Hydraulic model investigation of drifting snow. Wuebben, J.L., [1978, 29p.] CR 78-16	Airborne-Snow Concentration Measuring Equipment. La- combe, J., 1982, p.17-461 MP 1981
ton, N., et al, [1985, p.12-15] MIP 2027	Modelling a snowdrift by means of activated clay particles. Anno, Y., [1985, p.48-52] MP 2807	Snow and fog particle size measurements. Berger, R.H., [1982, p.47-58] MP 1982
Techniques for measurement of snow and ice on freshwater. Adams, W.P., et al, [1986, p.174-222] MP 2000	Snowfall Midwinter temperature regime and snow occurrence in Ger-	Snow particle morphology in the seasonal snow cover. Colbeck, S.C., [1983, p.602-609] MP 1688
Snew temperature Mesoscale measurement of snow-cover properties. Bilello,	many. Bileilo, M.A., et al, [1978, 56p.] CR 78-21 Synoptic meteorology during the SNOW-ONE field experi-	SNOW-ONE-B data report. Bates, R.E., ed, 1983,
M.A., et al, [1973, p.624-643] MP 1029 Computer simulation of the snowmelt and soil thermal regime	ment. Bilello, M.A., (1981, 55p.) SR 81-27 Measurements of airborne-snow concentration. Lacombe,	Characterization of snow for evaluation of its effect on elec-
at Barrow, Alaska. Outcalt, S.I., et al, [1975, p.709-715] MP 857	J., [1982, p.225-281] MP 1563 Snow cover characterization. O'Brien, H.W., et al, [1982,	tromagnetic wave propagation. Berger, R.H., (1983, p.35-42) MP 1648
Compressibility characteristics of compacted anow. Abele, G., et al, [1976, 47p.] CR 76-21	p.559-577; MP 1564 Synoptic weather conditions during snowfall, Dec. 1981-Feb.	Attenuation and backscatter for snow and aleet at 96, 140, and 225 GHz. Nemarich, J., et al, [1984, p.41-52] MP 1864
On the temperature distribution in an air-ventilated snow layer. Yen, YC., [1982, 10p.] CR 82-05	1982. Bilelio, M.A., [1982, p.9-42] MP 1559 Snow crystal habit. Koh, G., et al, [1982, p.181-216]	Catalog of smoke/obscurant characterization instruments.
Snow thermal properties Analysis of water flow in dry snow. Colbeck, S.C., [1976,	MP 1561 SNOW-ONE-A; Data report. Aitken, G.W., ed, 1982,	O'Brien, H.W., et al., [1984, p.77-82] MP 1865 Forward-scattering corrected extinction by nonspherical par-
p.523-527; MP 871 Regineering properties of snow. Mellor, M., [1977, p.15-	641p.3 SE \$2-68	ticles. Bohren, C.F., et al, [1984, p.261-271] MP 1870
66j MP 1015 Thermodynamics of snow metamorphism due to variations in	Meteorology. Bates, R.B., [1982, p.43-180] MP 1560 Meteorological measurements at Camp Bthan Allen Training	Performance of microprocessor-controlled snow crystal repli- cator. Koh, G., [1984, p.107-111] MP 1866
curvature. Colbeck, S.C., [1980, p.291-301] MP 1368	Center, Vermont. Bates, R., [1982, p.77-112] MP 1984	Forward-scattering corrected extinction by nonapherical par- ticles. Bohren, C.F., et al, [1985, p.1023-1029]
Review of thermal properties of snow, ice and sea ice. Yen,	Airborne-Snow Concentration Measuring Equipment. Lacombe, J., [1982, p.17-46] MP 1981	MP 1958 What becomes of a winter snowflake. Colbeck, S.C., [1985.
Snow calorimetric measurement at SNOW-ONE. Fisk, D.,	Snow Symposium, 1st, Hanover, NH, Aug. 1981, r1982, 324p.; SE 82-17	p.312-215 ₁ MP 2060 Snownelt
[1982, p.133-138] MP 1986 Thermal convection in snow. Powers, D.J., et al. [1985,	Meteorology and observed snow crystal types during the SNOW-ONE experiment. Bilello, M.A., [1982, p.59-	Water percolation through homogeneous snow. Colbeck, S.C., et al, (1973, p.242-257) MP 1925
61p.j CR 85-09 Snow vehicles	75 ₁ MP 1983 Falling snow characteristics and extinction. Berger, R.H.,	Tundra environment at Barrow, Alaska. Bunnell, F.L., et al. (1975, p.73-124) MIP 1050
Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933	[1983, p.61-69] MP 1756 Atmospheric conditions and snow crystal observations during	Effects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 948
Snow water content Water percolation through homogeneous snow. Colbeck,	SNOW-ONE-A. Bilello, M.A., et al, [1983, p.3-18] MP 1754	Energy balance and runoff from a subarctic snowpack. Price, A.G., et al, [1976, 29p.] CR 76-27
S.C., et al, [1973, p.242-257] MP 1025 Analysis of water flow in dry snow. Colbeck, S.C., [1976,	Visible propagation in falling snow as a function of mass con- centration and crystal type. Lacombe, J., et al, 1983,	Computer routing of unsaturated flow through snow. Tuck-
p.523-527 ₁ MP 871 Compression of wet snow. Colbeck, S.C., et al, 1978,	p.103-111 ₁ MIP 1757 Performance and optical signature of an AN/VVS-1 laser	Snow accumulation, distribution, melt, and runoff. Colbeck,
17p. ₃ CR 78-10	rangefinder in falling anow: Preliminary test results. La- combe, J., [1983, p.253-266] MP 1759	S.C., et al, [1979, p.465-468] MP 1233 Case study: fresh water surply for Point Hope, Alaska
Difficulties of measuring the water saturation and porosity of snow. Colbeck, S.C., [1978, p.189-201] MP 1124	Snow Symposium, 2nd, 1982. [1983, 295p.] SR 83-64 Northwest snowstorm of 15-16 December 1981. Bates,	McFadden, T., et al., (1979, p.1029-1040) MP 1222 Tundra lakes as a source of fresh water: Kipnuk, Alaska
Effect of water content on the compressibility of snow-water mixtures. Abele, G., et al. [1979, 26p.] CR 79-02	R.B., [1983, p.19-34] MIP 1755 Synoptic meteorology during the SNOW-ONE-A Field Ex-	Bredthauer, S.R., et al, [1979, 16p.] SR 79-30 Watershed modeling in cold regions. Stokely, J.L., [1980,
Liquid distribution and the dielectric constant of wet snow. Colbeck, S.C., [1980, p.21-39] MP 1349	periment. Bilello, M.A., [1983, 80p.] SR 83-10 SNOW-ONE-B data report. Bates, R.E., ed. [1983,	241p. ₁ Use of Landsat data for predicting snowmelt runoff in the
Overview of sessonal snow metamorphism. Colbeck, S.C., [1982, p.45-61] MP 1500	284p. _] SR 83-16 Snow characterization at SNOW-ONE-B. Berger, R.H., et	upper Saint John River basin. Merry, C.J., et al, [1983, p.519-533] MP 1694
Snow calorimetric measurement at SNOW-ONE. Fisk, D., [1982, p.133-138] MP 1986	al, [1983, p.155-195] MP 1847 Site-specific and synoptic meteorology. Bates, R.E., [1983,	Hydrologic aspects of ice jams. Calkins, D.J., {1986, p.603-609} MP 2116
Prec water measurements of a snowpack. Fisk, D.J., (1983, p.173-176) MP 1758	p.13-80 ₁ MP 1845 Atmospheric turbulence measurements at SNOW-ONE-B.	Snowsterms Synoptic weather conditions during snowfall, Dec. 1981-Feb.
Snow particle morphology in the seasonal snow cover. Colbeck, S.C., [1983, p.602-609] MIP 1688	Andreas, E.L., [1983, p.81-87] MP 1846 Snow concentration and effective air density during snow-	1982. Bilello, M.A., [1982, p.9-42] MP 1559 SNOW-ONE-A; Data report. Aitken, G.W., ed, [1982,
Progress in methods of measuring the free water content of snow. Fisk, D.J., [1983, p.48-51] MP 1649	falls. Mellor, M., [1983, p.505-507] MP 1769 Technique for measuring the mass concentration of falling	641p. ₁ SR 82-08 Airborne snow and fog distributions. Berger, R.H., (1982,
Landsat-4 thematic mapper (TM) for cold environments. Gervin, J.C., et al, [1983, p.179-186] MP 1651	anow. Lacombe, J., [1983, p.17-28] MP 1647 Characterization of snow for evaluation of its effect on elec-	p.217-223 ₁ MP 1562 Meteorology. Bates, R.E., [1982, p.43-180 ₁ MP 1560
Use of radio frequency sensor for snow/soil moisture water content measurement. McKim, H.L., et al, [1983, p.33-	tromagnetic wave propagation. Berger, R.H., 1983, p.35-421 MP 1648	Northwest snowstorm of 15-16 December 1981. Bates R.E., [1983, p.19-34] MP 1755
42 ₁ MP 1689 New classification system for the seasonal snow cover. Col-	Comments on the metamorphism of snow. Colbeck, S.C., [1983, p.149-151] MP 1650	Sell aggregates Repetitive loading tests on membrane enveloped road sec-
beck, S.C., [1984, p.179-181] MP 1921 Statistics of coarsening in water-saturated snow. Colbeck,	Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1. [1983, 241p.] SR 83-31	tions during freeze thaw. Smith, N., et al., [1977, p.171-197] MP 962
S.C., (1986, p.347-352) MP 2015 Snow water equivalent	Comparative near-millimeter wave propagation properties of snow or rain. Nemarich, J., et al, (1983, p.115-129)	Sell analysis Reclamation of acidic dredge soils with sewage sludge and
Analysis of snow water equivalent using LANDSAT data. Merry, C.J., et al., 1977, 16 leaves, MP 1113	MP 1690 Utilization of the snow field test series results for development	lime. Palazzo, A.J., [1977, 24p.] SR 77-19
Landsat data for watershed management. Cooper, S., et al,	of a snow obscuration primer. Ebersole, I.F., et al., [1983, p.209-217] MP 1692	Sell chemistry Proceedings 1972 Tundra Biome symposium. [1972, 211p.] MP 1374
Landsat data analysis for New England reservoir manage-	Field sampling of snow for chemical obscurants at SNOW- TWO/Smoke Week VI. Cragin, J.H., [1984, p.265-270]	Ionic migration and weathering in frozen Antarctic soils.
ment. Merry, C.J., et al., (1978, 61p.) SR 78-06 Snow cover mapping in northern Maine using LANDSAT.	MP 2996 Snow-Two/Smoke Week VI field experiment plan. Red-	Ugolini, F.C., et al. (1973, p.461-470) MP 941 Micrometeorological investigations near the tundra surface
Merry, C.J., et al, [1979, p.197-198] MP 1510 Snowpack estimation in the St. John River basin. Power,	field, R.K., et al. [1984, 85p.] SR 84-19 Climate at CRREL, Hanover, New Hampshire. Bates, R.E.,	Kelley, J.J., (1973, p.109-126) MP 1906 Soil properties of the International Tundra Biome sites
J.M., et al, 1980, p.467-486, MP 1799 New 2 and 3 inch diameter CRREL snow samplers. Bates,	[1984, 78p.] SR 84-24 Frozen precipitation and weather, Munchen/Riem, West	Brown, J., et al., [1974, p.27-48] MP 1043 Upland forest and its soils and litters in interior Alaska.
R.E., et al, [1980, p.199-200] MP 1430 Ground snow loads for structural design. Ellingwood, B., et	Germany. Bilello, M.A., [1984, 47p.] SR 84-32 Snow Symposium, 4th, Hanover, NH, Vol.1. [1984, 433p.]	Troth, J.L., et al, [1976, p.33-44] MP 867 Land treatment of wastewater. Murrmann, R.P., et al,
al, 1983, p.950-9641 MP 1734 Snow cover and meteorology at Allagash, Maine, 1977-1980.	SR 24-35 Approach to snow propagation modeling. Koh, G., [1984,	[1976, 36p.] MP 920 Wastewater reuse at Livermore, California. Uiga, A., et al.
Bates, R., [1983, 49p.] SR 83-20 Use of Landsat data for predicting snowmelt runoff in the	p.247-259 MP 1869 Performance of microprocessor-controlled snow crystal repli-	(1976, p.511-531) MP 870
upper Saint John River basin. Merry, C.J., et al, [1983, p.519-533] MP 1694	cator. Koh, G., [1984, p.107-111] MP 1866 Snow chemistry of obscurants released during SNOW-	treatment system. Iskandar, I.K., et al. (1976, 44). CR 76-19
Snow Symposium, 3rd, Hanover, NH, Aug. 1983, Vol.1. [1983, 241p.] SR 83-31	TWO/Smoke Week VI. Cragin, J.H., [1984, p.409-416] MP 1873	Reclamation of wastewater by application on land. Iskandar I.K., et al. (1976, 15p.) MP 896
Hydrologic forecasting using Landsat data. Merry, C.J., et al., 1983, p.159-168; MP 1691	Frozen precipitation and concurrently observed meteorologi- cal conditions. Bilello, M.A., (1985, 11p.) MP 2075	Urban waste as a source of heavy metals in land treatment Iskandar, I.K., 1976, p.417-432; MP 977

Sell chemistry (cont.)	Soil freezing response: influence of test conditions. McCabe, E.Y., et al, [1985, p.49-58] MP 1990	Thermal and creep properties for frozen ground construction Sanger, F.J., et al, [1979, p.311-337] MP 122
Effects of wastewater application on forage grasses. Palazzo, A.J., (1976, 8p.) CR 76-39	Freeze thaw consolidation of sediments, Beaufort Ses, Alas-	Construction and performance of membrane encapsulate
Examining anteretic soils with a scanning electron micro- scope. Kumai, M., et al, [1976, p.249-252] MP 931	ks. Lee, H.J., et al, [1985, 83p.] MP 2025 Soil composition	soil layers in Alaska. Smith, N., [1979, 27p.] CR 79-1
Reclamation of scidic dredge soils with sewage sludge and	Soil properties of the International Tundra Biome sites. Brown, J., et al, [1974, p.27-48] MP 1043	Frost heave in an instrumented soil column. Berg, R.L., e al, [1980, p.211-221] MP 133
Effects of wastewater on the growth and chemical composi-	Tundra environment at Barrow, Alaska. Bunnell, F.L., et al.	Low temperature phase changes in moist, briny clays. And
tion of forages. Palazzo, A.J., [1977, p.171-180] MP 975	[1975, p.73-124] MP 1050 Antarctic soil studies using a scanning electron microscope.	erson, D.M., et al, [1980, p.139-144] MP 133 Adsorption force theory of frost heaving. Takagi, S., [1980,
UV radiational effects on: Martian regolith water. Nadeau,	Kumai, M., et al, [1978, p.106-112] MIP 1386	p.57-81 ₁ NP 133 Frost heave model based upon heat and water flux. Guy
P.H., [1977, 89p.] MP 1072 Land treatment of wastewater at Manteca, Calif., and Quincy,	Tundra and analogous soils. Everett, K.R., et al., [1981, p.139-179] MP 1405	mon, G.L., et al, [1980, p.253-262] MP 133
Washington. Iskandar, I.K., et al, [1977, 34p.]	VHF electrical properties of frozen ground near Point Barrow, Alaska. Arcone, S.A., et al, [1981, 18p.] CR 81-13	Overconsolidation effects of ground freezing. Chamberlain E.J., [1980, p.325-337] MP 145
Methodology for nitrogen isotope analysis at CRREL. Jen-	Model for dielectric constants of frozen soils. Oliphant, J.L.,	Numerical solutions for rigid-ice model of secondary from
kins, T.F., et al, [1978, 57p.] SR 78-08 NMR phase composition measurements on moist soils.	[1985, p.46-57] MP 1926 Soll creep	heave. O'Neill, K., et al, [1980, p.656-669] MP 145
Tice, A.R., et al, [1978, p.11-14] MP 1210	In-plane deformation of non-coaxial plastic soil. Takagi, S.,	Field studies of membrane encapsulated soil layers with additives. Eaton, R.A., et al, [1980, 46p.] SR 80-3
NO3-N in percolate water in land treatment. Iskandar, I.K., et al, [1978, p.163-169] MP 1148	[1978, 28p.] CE 78-07 Steady in-plane deformation of noncoaxial plastic soil.	Neumann solution applied to soil systems. Lunardini, V.J
Nitrogen behavior in land treatment of wastewater: a simplified model. Selim, H.M., et al, [1978, p.171-179]	Takagi, S., [1979, p.1049-1072] MP 1248 Kinetic nature of the long term strength of frozen soils. Fish,	[1980, 7p.] CR 80-2 Some approaches to modeling phase change in freezing soils
MP 1149	A.M., (1980, p.95-108) MP 1450	Hromadka, T.V., II, et al, [1981, p.137-145] MP 143
Uptake of nutrients by plants irrigated with wastewater. Clapp, C.E., et al, [1978, p.395-404] MP 1151	Acoustic emissions during creep of frozen soils. Fish, A.M., et al, (1982, p.194-206) MP 1495	Comparative evaluation of frost-susceptibility tests. Charr
Overview of existing land treatment systems. lakandar, I.K., (1978, p.193-200) MP 1150	Deformation and failure of frozen soils and ice due to stresses. Pish, A.M., 1982, p.419-428; MP 1553	berlain, E.J., (1981, p.42-52) MP 148 Effect of freezing and thawing on resilient modulus of grant
Simulation of the movement of conservative chemicals in soil	Field tests of a frost-heave model. Guymon, G.L., et al,	lar soila. Cole, D.M., et al, [1981, p.19-26] MP 148
solution. Nakano, Y., et al, [1978, p.371-380] MP 1156	[1983, p.409-414] MP 1657 Creep behavior of frozen silt under constant uniaxial stress.	CRREL frost heave test, USA. Chamberlain, E.J., et a
Adaptability of forage grasses to wastewater irrigation.	Zhu, Y., et al, [1983, p.1507-1512] MIP 1805	[1981, p.55-62] MP 149 Ice segregation in a frozen soil column. Guymon, G.L.,
Performance of overland flow land treatment in cold climates.	Foundations on permafrost, US and USSR design and prac- tice. Fish, A.M., (1983, p.3-24) MP 1682	al, [1981, p.127-140] MIP 153
Jenkins, T.F., et al, [1978, p.61-70] MP 1152 Waste water reuse in cold regions. lskandar, I.K., [1978,	Thermodynamic model of soil creep at constant stresses and	Frost susceptibility of soil; review of index tests. Chamber lain, E.J., [1981, 110p.] M \$1-0
p.361-368 ₁ MP 1144	strains. Fish, A.M., (1983, 18p.) CR 83-33 Creep behavior of frozen silt under constant uniaxial stress.	Numerical solutions for a rigid-ice model of secondary from heave. O'Neill, K., et al, 1982, 11p.; CR 82-1
Kinetics of denitrification in land treatment of wastewater. Jacobson, S., et al, [1979, 59p.] SR 79-04	Zhu, Y., et al, [1984, p.33-48] MP 1807 Thermodynamic model of creep at constant stress and con-	Comparison of unfrozen water contents measured by DS6
Spray application of wastewater effluent in Vermont. Cas-	stant strain rate. Fish, A.M., [1984, p.143-161]	and NMR. Oliphant, J.L., et al, [1982, p.115-121] MP 159
sell, E.A., et al. [1979, 38p.] SR 79-06 Soil characteristics and climatology during wastewater ap-	MP 1771 Tertiary creep model for frozen sands (discussion). Fish,	Freezing of soil with surface convection. Lunardini, V.J.
plication at CRREL. Iskandar, I.K., et al, [1979, 82p.] SR 79-23	A.M., et al., 1984, p.1373-1378, MP 1810 Prozen ground physics. Fish, A.M., 1985, p.29-36,	[1982, p.205-212] MP 159 Initial stage of the formation of soil-laden ice lenses. Takag
Nitrogen transformations in land treatment. Jenkins, T.F.,	MP 1928	Initial stage of the formation of soil-laden ice lenses. Takag S., [1982, p.223-232] MP 159 Frost susceptibility of soil; review of index tests. Chamber
et al, [1979, 32p.] SR 79-31 Land application of wastewater: effect on soil and plant potas-	Soil erosion Revegetation and erosion control of the Trans-Alaska Pipe-	lain, E.J., [1982, 110p.] MP 155
sium. Palazzo, A.J., et al, [1979, p.309-312] MP 1228	line. Johnson, L.A., et al, [1977, 36p.] SR 77-08	Frost heave model. Hromadka, T.V., II, et al, 1982, p.1- 10 ₁ MP 156
Prototype wastewater land treatment system. Jenkins, T.F.,	Human-induced thermokarst at old drill sites in northern Alaska. Lawson, D.B., et al, [1978, p.16-23]	Transport of water in frozen soil, Part 1. Nakano, Y., et a
et al, [1979, 91p.] SR 79-35 Enzyme kinetic model for nitrification in soil amended with	MP 1254 Revegetation along roads and pipelines in Alaska. Johnson,	(1982, p.221-226) MP 162 Freezing of semi-infinite medium with initial temperatur
ammonium. Leggett, D.C., et al, [1980, 20p.]	L.A., [1980, p.129-150] MP 1353	gradient. Lunardini, V.J., [1983, p.649-652] MP 158
Model for nitrogen behavior in land treatment of wastewater.	Revegetation along the trans-Alaska pipeline, 1975-1978. Johnson, A.J., [1981, 115p.] CR 81-12	Effects of ice on the water transport in frozen soil. Nakano
Selim, H.M., et al, [1980, 49p.] CR 80-12 Dynamics of NH4 and NO3 in cropped soils irrigated with	Modifications of permafrost, East Oumalik, Alaska. Law-	Y., et al, (1983, p.15-26) MP 160 Freezing and thawing: heat balance integral approximations
wastewater. Iskandar, I.K., et al, (1980, 20p.)	son, D.E., [1982, 33p.] CR 82-36 Reservoir bank erosion caused and influenced by ice cover.	Lunardini, V.J., (1983, p.30-37 ₃ MP 159 Boundary integral equation solution for phase change prob
SR 80-27 Removal of organics by overland flow. Martel, C.J., et al,	Gatto, L.W., [1982, 26p.] SR 82-31 Bank recession of Corps of Engineers reservoirs. Gatto,	lems. O'Neill, K., (1983, p.1825-1850) MIP 209
[1980, 9p.] MP 1362	L.W., et al, [1983, 103p.] SR 83-30	Frost heave of saline soils. Chamberlain, E.J., [1983, p.121-126] MP 165
Effectiveness of land application for P removal from waste water. Iskandar, I.K., et al, [1980, p.616-621]	Erosion of perennially frozen streambanks. Lawson, D.E., (1983, 22p.) CR 83-29	Investigation of transient processes in an advancing zone of
MP 1444 Modeling N transport and transformations in soils. Selim,	Tanana River monitoring and research studies near Pair-	freezing. McGaw, R., et al, [1983, p.821-825] MP 166
H.M., et al, [1981, p.233-241] MP 1440	banks, Alaska. Neill, C.R., et al, [1984, 98p. + 5 appends.] SR 84-37	Simple model of ice segregation using an analytic function t model heat and soil-water flow. Hromadka, T.V., II, et a
Modeling nitrogen transport and transformations in soils: 2. Validation. Iskandar, I.K., et al, [1981, p.303-312]	Erosion analysis of the Tanana River, Alaska. Collins, C.M., [1984, 8p. + figs.] MP 1748	[1984, p.99-104] MP 210 Freezing of a semi-infinite medium with initial temperatur
MP 1441 Model for prediction of nitrate leaching losses in soils. Meh-	Bank recession of the Tanana River, Alaska. Gatto, L.W.,	gradieni. Luumdini, V.J., [1984, p.103-106]
ran, M., et al, [1981, 24p.] CR 81-23	(1984, 59p.) MP 1746 Chena Flood Control Project and the Tanana River near Fair-	MP 174 Frost action and its control. Berg. R.L., ed. (1984, 145).
Effect of soil temperature on nitrification kinetics. Parker, L.V., et al, (1981, 27p.) SR \$1-33	banks, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745	Frost action and its control. Berg, R.L., ed, [1984, 145p.] MP 170 Designing for frost heave conditions. Crory, F.E., et a
P removal during land treatment of wastewater. Ryden, J.C., et al, [1982, 12p.] SR \$2-14	Bank recession and channel changes of the Tanana River,	(1984, p.22-44) MP 170
Mathematical simulation of nitrogen interactions in soils.	Alaska. Gatto, L.W., et al, [1984, 98p.] MP 1747 Bank erosion, vegetation and permafrost, Tanana River near	Survey of methods for classifying frost susceptibility. Chamberlain, E.J., et al, [1984, p.104-141] MP 170
Selim, H.M., et al., [1983, p.241-248] MP 2051 Frost heave of saline soils. Chamberlain, E.J., [1983, p.121-	Fairbanks. Gatto, L.W., [1984, 53p.] SR 84-21 Vegetation recovery in the Cape Thompson region, Alaska.	Heat and moisture transfer in frost-heaving soils. Guymor
126 ₁ MP 1655	Everett, K.R., et al, [1985, 75p.] CR 85-11	G.L., et al. (1984, p.336-343) MF 176 Freezing of soil with phase change occurring over a finit
Restoration of acidic dredge soils with sewage studge and lime. Palazzo, A.J., [1983, 11p.] CR 83-28	Soil formation Tundra and analogous soils. Everett, K.R., et al., [1981,	temperature zone. Lunardini, V.J., [1985, p.38-46] MP 185
Techniques for measuring Hg in soils and sediments. Cragin, J.H., et al, (1985, 16p.) SR 85-16	p.139-179 ₃ MP 1405	Automated soils freezing test. Chamberlain, E.J., [1985,
Explosive residues in soil. Jenkins, T.P., et al, [1985, 33p.]	Soil treezing Remote-reading tensiometer for use in subfreezing tempera-	5p. ₁ MP 189 Soil freezing response: influence of test conditions. McCabe
SiR 85-22 Soil classification	tures. McKim, H.L., et al., [1976, p.31-45] MP 897 Calculating unfrozen water content of frozen soils. McGaw,	E.Y., et al, (1985, p.49-58) MP 199 Potential use of artificial ground freezing for contaminan
Foundations on permafrost, US and USSR design and prac-	R., et al, [1976, p.114-122] MP 899	Potential use of artificial ground freezing for contaminar immobilization. Iakandar, I.K., et al, [1985, 10p.] MP 202
tice. Fish, A.M., t1983, p.3-24; MP 1682 Soll compaction	Periodic structure of New Hampshire silt in open-system freezing. McGaw, R., [1977, p.129-136] MP 902	Literature review: effect of freezing on hazardous waste site
Consolidating dredged material by freezing and thawing. Chamberlain, E.J., (1977, 94p.) MP 978	Consolidating dredged material by freezing and thawing. Chamberlain, E.J., [1977, 94p.] MP 978	Iskandar, I.K., et al, [1985, p.122-129] MP 202 Ground freezing for management of hazardous waste site
Enclosing fine-grained soils in plastic moisture barriers.	Segregation freezing as the cause of suction force for ice lens	Sullivan, J.M., Jr., et al, [1985, 15p.] MP 203
Smith, N., [1978, p.560-570] MP 1089 Densification by freezing and thawing of fine material	formation. Takagi, S., [1978, p.45-51] MP 1081 Segregation freezing as the cause of suction force for ice lens	Model of freezing front movement. Hromadka, T.V., II, e al, (1985, 9p.) MP 207
dredged from waterways. Chamberlain, E.J., et al, [1978,	formation. Takagi, S., (1978, 13p.) CR 78-06	Soil mechanics
Increasing the effectiveness of soil compaction at below-freez-	p.235-242 ₁ MP 1173	Segregation freezing as the cause of suction force for ice len formation. Takagi, S., [1978, 13p.] CR 78-0
ing temperatures. Haas, W.M., et al, (1978, 58p.) SR 78-25	Thermal and creep properties for frozen ground construction. Sanger, F.J., et al, [1978, p.95-117] MP 1624	Resilient response of two frozen and thawed soils. Chambe: lain, E.J., et al, (1979, p.257-271) MP 117
Construction of an embankment with frozen soil. Botz, J.J., et al, [1980, 105p.] SR 80-21	Resiliency of subgrade soils during freezing and thawing.	Dynamic testing of free field stress gages in frozen soil. Aiti
m, (1700, 100ps) OR 60-21	Johnson, T.C., et al, [1978, 59p.] CR 78-23	en, G.W., et al, {1980, 26p. ₁ SR 80-3

Soil infiltration on land treatment sites. Abele, G., et al., r1980, 41p.; SR 89-36	Grouting of soils in cold environments: a literature search. Johnson, R., [1977, 49p.] SR 77-42	Mars soil-water analyzer: instrument description and status. Anderson, D.M., et al, [1977, p.149-158] MP 912
Laboratory and field use of soil tensiometers above and below	Blectromagnetic survey in permafrost. Selimann, P.V., et al,	Colloquium on Water in Planetary Regoliths, Hanover, N.H.,
O deg C. Ingersoll, J., (1981, 17p.) SR 81-07	[1979, 7p.] SR 79-14	Oct. 5-7, 1976. [1977, 161p.] MP 911
Prediction of explosively driven relative displacements in rocks. Blouin, S.E., [1981, 23p.] CR 81-11	Effect of freezing and thawing on resilient modulus of granular soils. Cole, D.M., et al, (1981, p.19-26)	Enclosing fine-grained soils in plastic moisture barriers. Smith, N., [1978, p.560-570] MP 1689
Site investigations and submarine soil mechanics in polar re-	MP 1484	Fundamentals of ice lens formation. Takagi, S., [1978,
gions. Chamberiain, E.J., [1981, 18p.] SR 81-24 Prost susceptibility of soil; review of index tests. Chamber-	Testing shaped charges in unfrozen and frozen silt in Alaska. Smith, N., [1982, 10p.] SR 82-02	p.235-242; MP 1173 Simplified method for monitoring soil moisture. Walsh, J.E.,
lain, B.J., [1981, 110p.] M 81-02	Seasonal soil conditions and the reliability of the M15 land	et al, (1978, p.40-44) MP 1194
Prost susceptibility of soil; review of index tests. Chamber-	mine. Richmond, P.W., et al, [1984, 35p.] SR 84-18	Increasing the effectiveness of soil compaction at below-freez-
lain, E.J., [1982, 110p.] MP 1557 Review of methods for generating synthetic sciamograms.	Mapping resistive seabed features using DC methods. Sell- mann, P.V., et al, [1985, p.136-147] MP 1918	ing temperatures. Hass, W.M., et al, [1978, 58p.] SR 78-25
Peck, L., [1985, 39p.] CR 85-10	Sell structure	Construction and performance of platinum probes for meas-
Sell microbiology Nitrification inhibitor in land treatment of wastewater in cold	Proposed size classification for the texture of frozen continuaterials. McGaw, R., [1975, 10p.] MP \$21	urement of redox potential. Blake, B.J., et al, [1978, 8p.] SR 78-27
regions. Elgawhary, S.M., et al, [1979, 25p.]	Evaluation of MESL membrane—puncture, stiffness, temper-	Construction and performance of membrane encapsulated
SR 79-18	ature, solvents. Sayward, J.M., [1976, 60p.]	soil layers in Alaska. Smith, N., [1979, 27p.]
Analysis of water in the Martian regolith. Anderson, D.M., et al, (1979, p.33-38) MP 1469	Regionalized feasibility study of cold weather earthwork.	Analysis of water in the Martian regolith. Anderson, D.M.,
Arctic ecosystem: the coastal tundra at Barrow, Alaska.	Roberts, W.S., [1976, 190p.] SR 76-02	et al, [1979, p.33-38] MP 1409 Water movement in a land treatment system of wastewater by
Brown, J., ed, [1980, 571p.] MP 1355 cruce oil spills on subarctic permafrost in interior Alaska.	Periodic structure of New Hampshire silt in open-system freezing. McGaw, R., [1977, p.129-136] MP 902	overland flow. Nakano, Y., et al, [1979, p.185-206]
Johnson, L.A., et al, [1980, 67p.] CR 80-29	Preeze thaw effect on the permeability and structure of soils.	MP 1285 Survey of methods for soil moisture determination.
Soil microbiology. Bosatta, E., et al, [1981, p.38-44] MIP 1753	Chamberlain, E.J., et al, (1978, p.31-44) MP 1660 Freeze thaw effect on the purmoability and structure of soils.	Schmugge, T.J., et al, [1979, 74p.] MP 1639
Effect of soil temperature on nitrification kinetics. Parker,	Chamberlain, E.J., et al, [1979, p.73-92] MP 1225	Frost heave in an instrumented soil column. Berg, R.L., et
L.V., et al, (1981, 27p.) SR 81-33	Electron microscope investigations of frozen and unfrozen	al, [1980, p.211-221] MP 1331 Watershed modeling in cold regions. Stokely, J.L., [1980,
Soil physics Freeze thaw effect on the permeability and atructure of soils.	bentonite. Kumai, M., [1979, 14p.] CR 79-28 Soil-water potential and unfrozen water content and tempera-	241p. ₁ MP 1471
Chamberlain, B.J., et al, [1978, p.31-44] MP 1080	ture. Xu, X., et al, [1985, p.1-14] MP 1932	Review of techniques for measuring soil moisture in situ. McKim, H.L., et al, {1980, 17p.} SR 80-31
Preeze thaw effect on the permeability and structure of soils.	Soil surveys	Field studies of membrane encapsulated soil layers with addi-
Chamberlain, E.J., et al, (1979, p.73-92) MP 1225 Functional analysis of the problem of wetting fronts. Naka-	Tundra soils on the Arctic Slope of Alaska. Everett, K.R., et al, [1982, p.264-280] MP 1552	tives. Eaton, R.A., et al, [1980, 46p.] SR 80-33
no, Y., (1980, p.314-318) MIP 1307	Soil temperature	Soil hydraulic conductivity and moisture retention features. Ingersoll, J., [1981, 11p.] SR 81-02
Ground dielectric properties. Arcone, S.A., et al, ri982, 11p.; CR 82-96	Piles in permafrost for bridge foundations. Crory, F.E., et al., [1967, 41p.] MP 1411	Some approaches to modeling phase change in freezing soils.
Measurements of ground resistivity. Arcone, S.A., [1982,	Prediction and validation of temperature in tundra soils.	Hromadka, T.V., II, et al. [1981, p.137-145] MP 1437
p.92-110 ₁ MP 1513	Brown, J., et al, [1971, p.193-197] MP 907	Modeling N transport and transformations in soils. Selim,
Laboratory measurements of soil electric properties between 0.1 and 5 GHz. Delaney, A.J., et al, [1982, 12p.]	Abiotic overview of the Tundra Biome Program, 1971. Weller, G., et al, [1971, p.173-181] MP 906	H.M., et al, [1981, p.233-241] MP 1440
CR 82-10	Computer simulation of the snowmelt and soil thermal regime	Laboratory and field use of soil tensiometers above and below 0 deg C. Ingersoll, J., [1981, 17p.] SR 81-97
Horizontal infiltration of water in porous materials. Nakano, Y., 1982, p.156-1661 MP 1840	at Barrow, Alaska. Outcalt, S.I., et al, [1975, p.709-715] MP 857	Hydraulic characteristics of the Deer Creek Lake land treat-
Use of radio frequency sensor for snow/soil moisture water	Selected climatic and soil thermal characteristics of the	ment site during wastewater application. Abele, G., et al., [1981, 37p.] CR 81-07
content measurement. McKim, H.L., et al, [1983, p.33-42] MP 1689	Prudhoe Bay region. Brown, J., et al, [1975, p.3-12] MP 1054	Comparative evaluation of frost-susceptibility tests. Cham-
In-situ thermoconductivity measurements. Faucher, M.,	Surface temperature data for Atkasook, Alaska summer 1975.	berlain, E.J., [1981, p.42-52] MP 1486 Simulating frost action by using an instrumented soil column.
[1986, p.13-14] MP 2137	Haugen, R.K., et al, [1976, 25p.] SR 76-01	Ingersoll, J., et al, [1981, p.34-42] MP 1485
Soil pollution Urban waste as a source of heavy metals in land treatment.	Oil spills on permafrost. Collins, C.M., et al, [1976, 18p.] SR 76-15	Method for measuring enriched levels of deuterium in soil
Iskandar, I.K., [1976, p.417-432] MP 977	Kotzebue hospital—a case study. Crory, F.E., [1978,	water. Oliphant, J.L., et al, [1982, 12p.] SR 82-25 Relationship between ice and unfrozen water in frozen soils.
Explosives in soils and sediments. Cragin, J.H., et al., 1985, 11p.; CR 85-15	p.342-359; MP 1084 Thermal properties and regime of wet tundra soils at Barrow,	Tice, A.R., et al, [1983, p.37-46] MP 1632
11p.; CR 85-15 Explosive residues in soil. Jenkins, T.F., et al, (1985, 33p.)	Alaska. McGaw, R., et al, [1978, p.47-53]	Effect of loading on the unfrozen water content of silt. Oli- phant, J.L., et al, [1983, 17p.] SR 83-18
SR 45-22	MP 1096 Geophysics in the study of permafrost. Scott, W.J., et al,	Wetting fronts in porous media. Nakano, Y., [1983, p.71-
Effect and disposition of TNT in a terrestrial plant. Palazzo, A.J., et al, [1986, p.49-52] MP 2098	(1979, p.93-115) MP 1266	78 ₁ MP 1720
Soil pressure	Removal of organics by overland flow. Martel, C.J., et al, [1980, 9p.] MP 1362	Soil-water diffusivity of unsaturated frozen soils at aubzero temperatures. Nakano, Y., et al, [1983, p.889-893]
Segregation-freezing temperature as the cause of suction force. Takagi, S., [1977, p.59-66] MP 901	Waste heat utilization through soil heating. McFadden, T.,	MP 1664
Ground pressures exerted by underground explosions. John-	et al, [1980, p.105-120] MP 1363	Use of radio frequency sensor for snow/soil moisture water content measurement. McKim, H.L., et al, (1983, p.33-
son, P.R., [1978, p.284-290] MP 1520	Approximate solution to Neumann problem for soil systems. Lunardini, V.J., et al, (1981, p.76-81) MP 1494	42 ₁ MP 1689
Summary of the adsorption force theory of frost heaving. Takagi, S., [1980, p.233-236] MP 1332	Effect of soil temperature on nitrification kinetics. Parker,	Boundary value problem of flow in porous media. Nakano, Y., 1983, p.205-213; MP 1721
Soil stabilization	L.V., et al, [1981, 27p.] SR 81-33 CO2 effect on permafrost terrain. Brown, J., et al, [1982,	Experimental measurement of channeling of flew in porous
Thermoinsulating media within embankments on perennially frozen soil. Berg, R.L., [1976, 161p.] SR 76-03	30p. ₁ MP 1546	media. Oliphant, J.L., et al, [1985, p.394-399] MIP 1967
Utilization of sewage sludge for terrain stabilization in cold	Field tests of a frost-heave model. Guymon, G.L., et al, [1983, p.409-414] MP 1657	Phase equilibrium in frost heave of fine-grained soil. Naka-
regions. Gaskin, D.A., et al, [1977, 45p.] SR 77-37 Grouting silt and sand at low temperatures. Johnson, R.,	Relationships between estimated mean annual air and perma-	no, Y., et al, [1985, p.50-68] MP 1896 Soil-water potential and unfrozen water content and tempera-
Grouting silt and sand at low temperatures. Johnson, R., (1979, p.937-950) MP 1078	frost temperatures in North-Central Alaska. Haugen,	ture. Xu, X., et al, [1985, p.1-14] MP 1932
Sewage sludge for terrain stabilization, Part 2. Gaskin, D.A.,	R.K., et al., [1983, p.462-467] MP 1658 Soil tests	Prost heave of full-depth asphalt concrete pavements. Zom- erman, I., et al, [1985, p.66-76] MP 1927
et al, (1979, 36p.) SR 79-28 Utilization of sewage sludge for terrain stabilization in cold	Viking GCMS analysis of water in the Martian regolith.	Hydraulic properties of selected soils. Ingersoll, J., et al.
regions. Pt. 3. Rindge, S.D., et al, [1979, 33p.]	Anderson, D.M., et al, [1978, p.55-61] MP 1195 Small-scale testing of soils for frost action. Sayward, J.M.,	[1985, p.26-35] MP 1925
SR 79-34 Field studies of membrane encapsulated soil layers with addi-	(1979, p.223-231) MP 1309	Evaluating trafficability. McKim, H.L., (1985, p.474-475) MP 2623
tives. Baton, R.A., et al, [1980, 46p.] SR 80-33	Soil tests for frost action and water migration. Sayward, J.M., [1979, 17 p.] SR 79-17	Soil water migration
Plant growth on a gravel soil: greenhouse studies. Palazzo, A.J., et al, [1981, 8p.] SR 81-04	Soil texture	Segregation-freezing temperature as the cause of suction force. Takagi, S., [1977, p.59-66] MP 901
Chena River Lakes Project revegetation study-three-year	Enclosing fine-grained soils in plastic moisture barriers.	Mathematical model to predict frost heave. Berg, R.L., et al.
summary. Johnson, L.A., et al, [1981, 59p.]	Smith, N., [1978, p.560-570] MP 1089 Kinetic nature of the long term strength of frozen soils. Pish,	[1977, p.92-109] MP 1131
Revised procedure for pavement design under seasonal frost	A.M., [1980, p.95-108] MIP 1450	Moving boundary problems in the hydrodynamics of porous media. Nakano, Y., [1978, p.125-134] MP 1343
conditions. Berg, R., et al, [1983, 129p.] SR 83-27	Soil trafficability Effects of low ground pressure vehicle traffic on tundra.	Segregation freezing as the cause of suction force for ice lens
Performance of a thermosyphon with an inclined evaporator and vertical condenser. Zarling, J.P., et al, (1984, p.64-	Abele, G., et al. (1978, 63p.) SR 78-16	formation. Takagi, S., (1978, p.45-51) MP 10-1 Preeze thaw effect on the permeability and structure of soils.
68 ₁ MP 1677	Snow pads for pipeline construction in Alaska. Johnson,	Chamberlain, E.J., et al, [1978, p.31-44] MP 1080
Soil strength Evaluation of MESL membrane—puncture, stiffness, temper-	P.R., et al., [1980, 28p.] CR 80-17 Soil water	Load tests on membrane-enveloped road sections. Smith, N., et al, [1978, 16p.] CR 78-12
ature, solvents. Sayward, J.M., [1976, 60p.]	Ionic migration and weathering in frozen Antarctic soils.	Evaluation of the moving boundary theory. Nakano, Y.,
CR 76-22 Baseplate design and performance: mortar stability report.	Ugolini, F.C., et al., [1973, p.461-470] MP 941 Prediction of unfrozen water contents in frozen soils from	[1978, p.142-151] MP 1147 Simulation of the movement of conservative chemicals in soil
Aitken, G.W., [1977, 28p.] CR 77-22	liquid determinations. Tice, A.R., et al, (1976, 9p.)	solution. Nakano, Y., et al, [1978, p.371-380]
Resiliency in cyclically frozen and thawed subgrade soils. Chamberlain, E.J., et al. (1977, p.229-281) MP 1724	CR 76-08 On the origin of pingos—a comment. Mackey, J.R., [1976,	MP 1156 Heat and moisture flow in unsaturated soils. O'Neill, K.,
Repetitive loading tests on membrane enveloped road sec-	p.295-298 ₁ MP 916	(1979, p.304-309) MP 1259
tions during freeze thaw. Smith, N., et al, [1977, p.171-197] MP 962	Remote-reading tensiometer for use in subfreezing tempera- tures. McKim, H.L., et al, [1976, p.31-45] MP 897	Small-scale testing of soils for frost action. Sayward, J.M.,
		(1979, p.223-231 ₁ MP 1309

Sell water migration (cont.) Soil tests for frost action and water migration. Sayward,	Tundra and analogous soils. Everett, K.R., et al, [1981, p.139-179] MP 1405	Standards Measuring mechanical properties of ice. Schwarz, J., et al.
J.M., [1979, 17 p.] SE 79-17 Freeze thaw effect on the permeability and structure of soils.	South Shetland Islands Tundra and analogous soils. Everett, K.R., et al, [1981,	[1981, p.245-254] MP 1556 Ground snow loads for structural design. Ellingwood, B., et
Chamberlain, E.J., et al, [1979, p.73-92] MP 1225 Mathematical model to correlate frost heave of pavements.	p.139-179 ₁ MP 1405 Spaceborne photography	al, [1983, p.950-964] MP 1734 Static loads
Berg, R.L., et al, (1980, 49p.) CR 80-10 Functional analysis of the problem of wetting fronts. Naka-	Applications of remote sensing in New England. McKim, H.L., et al., 1975, 8p. + 14 figs. and tables. MP 913	Bearing capacity of floating ice plates. Kerr, A.D., [1976, p.229-268]
no, Y., (1980, p.314-318) MIP 1307	Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L. W., 1976, p.205-227, MP \$95	Acoustic emissions from polycrystalline ice. St. Lawrence,
Summary of the adsorption force theory of frost heaving. Takagi, S., [1980, p.233-236] MP 1332	Islands of grounded sea ice. Kovacs, A., et al, [1976, 24p.]	W.F., et al, [1982, 15p.] CR 82-21 Mechanical properties of multi-year sea ice. Testing tech-
Adsorption force theory of frost heaving. Takagi, S., (1980, p.57-81) MP 1334	CR 76-04 Land use and water quality relationships, eastern Wisconsin.	niques. Mellor, M., et al, [1984, 39p.] CR 84-08 Static stability
Froat heave model based upon heat and water flux. Guymon, G.L., et al, [1980, p.253-262] MP 1333	Haugen, R.K., et al. (1976, 47p.) CR 76-30 Skylab imagery: Application to reservoir management in New	Baseplate design and performance: morter stability report. Aitken, G.W., [1977, 28p.] CR 77-22
Overconsolidation effects of ground freezing. Chamberlain, B.J., (1980, p.325-337) MP 1452	England. McKim, H.L., et al, [1976, 51p.] SR 76-07	Stations Scientists visit Kolyma Water Balance Station in the USSR.
Soil infiltration on land treatment sites. Abele, G., et al, [1980, 41p.] SR 80-36	Antarctic sea ice dynamics and its possible climatic effects. Ackley, S.F., et al, [1976, p.53-76] MP 1378	Slaughter, C.W., et al, [1977, 66p.] SR 77-18 Subarctic watershed research in the Soviet Union. Slaugh-
Results from a mathematical model of frost heave. Guymon, G.L., et al, [1981, p.2-6] MP 1483	Environmental analyses in the Kootenai River region, Montana. McKim, H.L., et al, [1976, 53p.] SR 76-13	ter, C.W., et al, [1978, p.305-313] MIP 1273
Ice segregation in a frozen soil column. Guymon, G.L., et al, [1981, p.127-140] MP 1534	Visual observations of floating ice from Skylab. Campbell, W.J., et al, [1977, p.353-379] MP 1263	Extending the useful life of DYE-2 to 1986. Tobission, W., et al., (1980, 37p.) SR 86-13
Mobility of water in frozen soils. Lunardini, V.J., et al, [1982, c15p.] MP 2012	Landsat data for watershed management. Cooper, S., et al, [1977, c150p.] MP 1114	Science program for an imaging radar receiving station in Alaska. Weller, G., et al., [1983, 45p.] MP 1884
Horizontal infiltration of water in porous materials. Nakano, Y., [1982, p.156-166] MP 1840	1977 tundra fire in the Kokolik River area of Alaska. Hall, D.K., et al, [1978, p.54-58] MP 1125	Statistical analysis Midwinter temperature regime and snow occurrence in Ger-
Transport water in frozen soil, Part 1. Nakano, Y., et al. [1982, p.221-226] MP 1629	Water resources by satellite. McKim, H.L., [1978, p.164- 169] MP 1090	many. Bilello, M.A., et al, [1978, 56p.] CR 78-21 Break-up dates for the Yukon River; Pt.1. Rampart to White-
Effects of ice on the water transport in frozen soil. Nakano, Y., et al, (1983, p.15-26) MP 1601	Estuarine processes and intertidal habitats in Grays Harbor, Washington: a demonstration of remote sensing techniques.	horse, 1896-1978. Stephens, C.A., et al, [1979, c50] leaves ₁ MP 1317
Water migration due to a temperature gradient in frozen soil. Oliphant, J.L., et al., [1983, p.951-956] MP 1666	Gatto, L.W., [1978, 79p.] CR 78-18 Remote sensing for land treatment site selection. Merry,	Break-up dates for the Yukon River; Pt.2. Alakanuk to Tana- na, 1883-1978. Stephens, C.A., et al, [1979, c50 leaves]
Prozen soil-water diffusivity under isothermal conditions.	C.J., [1978, p.107-119] MP 1146	MP 1518 Cost-effective use of municipal wastewater treatment ponds.
Nakano, Y., et al., [1983, 8p.] CR 83-22 Two-dimensional model of coupled heat and moisture trans-	1977 tundra fire st Kokolik River, Alaska. Hall, D.K., et al. [1978, 11p.] SR 78-10	Reed, S.C., et al., [1979, p.177-200] MP 1413
port in frost heaving soils. Guymon, G.L., et al., [1984, p.91-98] MP 1678	Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] CR 80-04	Long distance heat transmission with steam and hot water.
Simple model of ice segregation using an analytic function to model heat and soil-water flow. Hromadka, T.V., II, et al.	Sea ice: the potential of remote sensing. Weeks, W.F., MP 1468	Aamot, H.W.C., et al, [1976, 39p.] MP 938 Measuring unmetered steam use with a condensate pump
[1984, p.99-104] MP 2104 Effects of ice content on the transport of water in frozen soils.	Antarctic sea ice microwave signatures. Comiso, J.C., et al. [1984, p.662-672] MP 1668	cycle counter. Johnson, P.R., [1977, p.434-442] MP 957
Nakano, Y., et al. (1984, p.28-34) MP 1841 Role of heat and water transport in frost heaving of porous	Spacecraft Progress report on ERTS data on Arctic environment. And-	Losses from the Fort Wainwright heat distribution system. Phetteplace, G., et al, [1981, 29p.] SR 81-14
soils. Nakano, Y., et al, [1984, p.93-102] MP 1842 Deuterium diffusion in a soil-water-ice mixture. Oliphant,	erson, D.M., et al, [1972, 3p.] MP 991 Near real time hydrologic data acquisition utilizing the	Steel structures Extending the useful life of DYE-2 to 1986, Part 1. Tobias-
J.L., et al, [1984, 11p.] SR 84-27 Transport of water in frozen soil. Nakano, Y., et al, [1984,	LANDSAT system. McKim, H.L., et al, (1975, p.200- 211 ₁ MP 1055	son, W., et al., (1979, 15p.) SR 79-27 Extending the useful life of DYE-2 to 1986. Tobiasson, W.,
p.172-179; MP 1819 Water migration in frozen clay under linear temperature	Remote sensing plan for the AIDJEX main experiment. Weeks, W.F., et al, (1975, p.21-48) MP 862	et al, [1980, 37p.] SR 30-13 Field tests of the kinetic friction coefficient of sea ice. Tatin-
gradients. Xu, X., et al, [1985, p.111-122] MP 1934 Experimental study on factors affecting water migration in	Descing a satellite communication antenna. Hanamoto, B., et al, [1980, 14p.] SR 80-18	claux, J.C., et al, [1985, 20p.] CR 85-17 Laboratory and field studies of ice friction coefficient. Tatin-
frozen morin clay. Xu, X., et al, (1985, p.123-128) MP 1897	Potential icing of the space shuttle external tank. Ferrick, M.G., et al, [1982, 305p.] CR 82-25	claux, J.C., et al. [1986, p.389-400] MP 2126 Stefan problem
Thawing of frozen clays. Anderson, D.M., et al, 1985, p.1- 91 MF 1923	Specific heat Thermal diffusivity of frozen soil. Haynes, F.D., et al,	Phase change around a circular pipe. Lunardini, V.J.,
Ion and moisture migration and frost heave in freezing Morin clay. Qiu, G., et al, [1986, p.1014] MIP 1970	(1980, 30p.) SR 80-38 Comparison of unfrozen water contents measured by DSC	Deforming finite elements with and without phase change.
Soils Geobotanical atlas of the Prudhoe Bay region, Alaska.	and NMR. Oliphant, J.L., et al, (1982, p.115-121) MP 1594	Lynch, D.R., et al, (1981, p.81-96) MP 1493 Phase change around insulated buried pipes: quasi-steady
Walker, D.A., et al, [1980, 69p.] CR 80-14 Effects of a tundra fire on soil and vegetation. Racine, C.,	Spectra	method. Lunardini, V.J., [1981, p.201-207] MP 1496
[1980, 21p.] SR 80-37 Introduction to abiotic components in tundra. Brown, J.,	Atmospheric turbulence measurements at SNOW-ONE-B. Andreas, E.L., [1983, p.81-87] MP 1846	Heat conduction with phase changes. Lunardini, V.J., [1981, 14p.] CR 81-25
(1981, p.79) MP 1432 Solar radiation	Water quality monitoring using an airborne spectroradiometer. McKim, H.L., et al, [1984, p.353-360] MP 1718	Preezing of semi-infinite medium with initial temperature gradient. Lunardini, V.J., [1983, p.649-652]
Tundra environment at Barrow, Alaska. Bunnell, F.L., et al., [1975, p.73-124] MP 1050	Observations of volcanic tremor at Mount St. Helens volcano.	MP 1583 Freezing and thawing: heat balance integral approximations.
Effects of radiation penetration on snowmelt runoff hydro-	Fehler, M., [1984, p.3476-3484] MP 1770 Spectrophotometers	Lunardini, V.J., [1983, p.30-37] MP 1597 Freezing of a semi-infinite medium with initial temperature
Light-colored surfaces reduce thaw penetration in permafrost.	Observations of the ultraviolet spectral reflectance of snow. O'Brien, H.W., [1977, 19p.] CR 77-27	gradient. Lunardini, V.J., [1984, p.103-106] MP 1740
Berg, R.L., et al, [1977, p.86-99] MP 954 Near-infrared reflectance of snow-covered substrates. O'-	Spectroradiometers Water quality measurements at Lake Powell, Utah. Merry,	Stefan problem in a finite domain. Takagi, S., (1985, 28p.) SR 85-08
Brien, H.W., et al, [1981, 17p.] CR \$1-21 Surface meteorology US/USSR Weddell Polynya Expedition,	C.J., (1977, 38p.) SR 77-28 Spectroscopy	Storms Synoptic meteorology during the SNOW-ONE-A Field Ex-
1981. Andreas, E.L., et al., [1983, 32p.] SR 83-14. On the decay and retreat of the ice cover in the summer MIZ.	Correlation and quantification of airborne spectrometer data to turbidity measurements at Lake Powell, Utah. Merry,	periment. Bilello, M.A., [1983, 80p.] SR 83-10 Strain measurement
Maykut, G.A., [1984, p.15-22] MP 1780 Approach to snow propagation modeling. Koh, G., [1984,	C.J., 1970, p.1309-1316; MP 1271 Remote sensing of water quality using an airborne spec-	Small-scale strain measurements on a glacier surface. Col-
p.247-259 ₁ MP 1869 Solutions	troradiometer. McKim, H.L., et al, [1980, p.1353-1362] MP 1491	beck, S.C., et al, [1971, p.237-243] MP 993 Strain measuring instruments
Nose shape and L/D ration, and projectile penetration in frozen soil. Richmond, P.W., [1980, 21p.] SR 80-17	Effects of volume averaging on spectra measured with a hygrometer. Andreas, E.L., [1981, p.467-475]	Waterproofing strain gages for low ambient temperatures. Garfield, D.E., et al, [1978, 20p.] SR 78-15
Transport equation over long times and large spaces. O'Neill, K., [1981, p.1665-1675] MP 1497	MP 1728 Characterization of snow for evaluation of its effect on elec-	Strain tests Investigation of ice forces on vertical structures. Hirayama,
Ice crystal growth in subcooled NaCl colutions. Sullivan, J.M., Jr., et al, [1985, p.527-532] MP 2100	tromagnetic wave propagation. Berger, R.H., [1983, p.35-42] MP 1648	K., et al, [1974, 153p.] MIP 1041 Effect of temperature and strain rate on the strength of poly-
Sound transmission Audibility within and outside deposited snow. Johnson, J.B.,	Landsat-4 thematic mapper (TM) for cold environments. Gervin, J.C., et al, (1983, p.179-186) MP 1651	crystalline ice. Haynes, F.D., [1977, p.107-111] MIP 1127
[1985, p.136-142] MP 1960 Sounding	Optical engineering for cold environments. Aitken, G.W., ed, [1983, 225p.] MP 1646	Axial double point-load tests on snow and ice. Kovacs, A., [1978, 11p.] CR 78-01
Some characteristics of grounded floebergs near Prudhoe Bay, Alaska. Kovacs, A., et al, [1976, p.169-172]	Wildlife habitat mapping in Lac qui Parle, Minnesota. Merry, C.J., et al, 1984,205-208, MP 2085	Polycrystalline ice mechanics. Hooke, R.L., et al., 11979, 16p.; MP 1287
MP 1118 Grounded floebergs near Prudhoe Bay, Alasks. Kovscs, A.,	Stability	Volumetric constitutive law for snow under strain. Brown, R.L., 1979, 13p.; CR 79-20
et al, [1976, 10p.] CR 76-34	Movement study of the trans-Alaska pipeline at selected sites. Uoda, H.T., et al., (1981, 32p.) CR 81-04	Asphalt concrete for cold regions. Dempsey, B.J., et al,
US/USSR Weddell Polynya expedition, Upper air data, 1981. Andreas, E.L., (1983, 288p.) SR 83-13	Stabilization Wastewater stabilization pond linings. Middlebrooks, B.J.,	[1980, 55p.] CR 89-65 Mechanical properties of polycrystalline ice. Hooke, R. L., et al. 1980 = 262 275.
South Georgia Soil properties of the International Tundra Biome sites. Brown I et al. 1974 p. 27-49. MED 1843	et al. (1978, 116p.) SR 78-28 Ice sheet retention structures. Perham, R.B., (1983, 33p.)	al, (1980, p.263-275) MP 1328 Strain measurements on dumbbell specimens. Mellor, M., 1082, p.75-27.
Brown, J., et al., [1974, p.27-48] MP 1043	CR 83-30	[1983, p.75-77] MIP 1683

Preliminary examination of the effect of structure on the com-	Grain size and the compressive strength of ice. Cole, D.M.,	Atmospheric icing of structures. Minsk, L.D., ed, [1983,
pressive strength of ice samples from multi-year pressure ridges. Richter, J.A., et al, [1984, p.140-144]	[1985, p.220-226] MP 1858 Stresses	366p.; Sil 83-17 Ice action on two cylindrical structures. Kato, K., et al,
MP 1685 Tensile strength of frozen silt. Zhu, Y., , [1986, p.15-28] MP 1971	Statistical variations in Arctic sea ice ridging and deformation rates. Hibler, W.D., III, t1975, p.J1-J161 MP 850	[1983, p.159-166] MP 1643 Crushing ice forces on cylindrical structures. Morris, C.E.,
Itrains	Interpretation of the tensile strength of ice under triaxial stress. Nevel, D.E., et al, (1976, p.375-387)	et al, [1984, p.1-9] MP 1834 Ice sheet retention structures. Perham, R.E., [1984, p.339-
Remote sensing program required for the AIDJEX model. Weeks, W.F., et al, [1974, p.22-44] MP 1840	MP 996 Interpretation of the tensile strength of ice under triaxial	348 ₁ MP 1832 Secondary stress within the structural frame of DYE-3: 1978-
Effect of temperature on the strength of frozen silt. Haynes, F.D., et al, [1977, 27p.] CR 77-03	stresses. Nevel, D.E., et al, [1976, 9p.] CR 76-05	1983. Ueda, H.T., et al, (1984, 44p.) SR 84-26
Application of the Andrade equation to creep data for ice and	Creep theory for a floating ice sheet. Nevel, D.E., [1976, 98p.] SR 76-04	Transfer of meteorological data from mountain-top sites. Govoni, J.W., et al, [1986, 6p.] MP 2107
frozen soil. Ting, J.M., et al, [1979, p.29-36] MIP 1802	Compressibility characteristics of compacted snow. Abele, G., et al, [1976, 47p.] CR 76-21	Subarctic landscapes
Volumetric constitutive law for snow under strain. Brown, R.L., r1979, 13p., CR 79-20	Resilient response of two frozen and thawed soils. Chamber-	Utility distribution systems in Iceland. Aamot, H.W.C., [1976, 63p.] SR 76-05
Acoustic emissions from polycrystalline ice. St. Lawrence,	lain, E.J., et al, [1979, p.257-271] MP 1176 Photoelastic instrumentation—principles and techniques.	Revegetation in arctic and subarctic North America—a litera-
W.F., et al, [1982, p.183-199] MIP 1524 Relationship between creep and strength behavior of ice at	Roberta, A., et al, [1979, 153p.] SR 79-13	ture review. Johnson, L.A., et al, [1976, 32p.]
failure. Cole, D.M., [1983, p.189-197] MIP 1681	Snow studies associated with the sideways move of DYE-3. Tobiasson, W., [1979, p.117-124] MP 1312	Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al, [1976, 21p.] MP 868
Effect of stress application rate on the creep behavior of poly- crystalline ice. Cole, D.M., [1983, p.454-459] MP 1671	Some results from a linear-viscous model of the Arctic ice cover. Hibler, W.D., III, et al, [1979, p.293-304]	Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanka, Alsaka. Johnson, L.A., [1978,
Variation of ice strength within and between multiyear pres-	MP 1241 Extending the useful life of DYE-2 to 1986, Part 1. Tobias-	p.460-466 ₁ MP 1100
sure ridges in the Beaufort Sea. Weeks, W.F., [1984, p.134-139] MP 1680	son, W., et al, [1979, 15p.] SR 79-27	Subglacial drainage Depth of water-filled crevasses of glaciers. Weertman, J.,
Static determination of Young's modulus in sea ice. Richter- Menge, J.A., [1984, p.283-286] MP 1789	Ice thickness-tensile stress relationship for load-bearing ice. Johnson, P.R., [1980, 11p.] SR 80-09	(1973, p.139-145) MP 1044
MIZEX 83 mesoscale sea ice dynamics: initial analysis. Hi-	Extending the useful life of DYE-2 to 1986. Tobiasson, W., et al., 1980, 37p.; SR 80-13	Diamictons at the margin of the Matanuska Glacier, Alaska. Lawson, D.E., [1981, p.78-84] MP 1462
bler, W.D., III, et al, [1984, p.19-28] MP 1811 Rheology of glacier ice. Jezek, K.C., et al, [1985, p.1335-	Adsorption force theory of frost heaving. Takagi, S., 1980,	Sub-ice channels and frazil bars, Tanana River, Alaska.
1337 ₁ MP 1844	p.57-81 ₁ MP 1334 Some promising trends in ice mechanics. Assur, A., (1980,	Lawson, D.E., et al, (1986, p.465-474) MP 2129 Subglacial observations
Deteriorated building panels at Sondrestrom, Greenland. Korhonen, C., [1985, p.7-10] MP 2017	p.1-15 ₁ MIP 1300	Investigation of ice islands in Babbage Bight. Kovacs, A., et al, 1971, 46 leaves; MP 1381
Strain rate effect on the tensile strength of frozen silt. Zhu, Y., et al, (1985, p.153-157; MP 1898	Dynamic testing of free field stress gages in frozen soil. Aitk- en, G.W., et al, [1980, 26p.] SR 80-30	Oil pooling under sea ice. Kovacs, A., [1979, p.310-323]
Frozen ground physics. Fish, A.M., (1985, p.29-36)	Kinetic nature of the long term strength of frozen soils. Fish, A.M., [1980, p.95-108] MP 1456	MP 1289 Physical properties of sea ice and under-ice current orients-
MP 1928	Propagation of stress waves in alpine snow. Brown, R.L.,	tion. Kovaca, A., et al., [1980, p.109-153] MP 1323
Stratified debris in Antarctic ice cores. Gow, A.J., et al. [1979, p.185-192] MP 1272	[1980, p.235-243] MP 1367 Preliminary results of ice modeling in the East Greenland	Measurement of the shear stress on the underside of simulated ice covers. Calkins, D.J., et al, [1980, 11p.]
Stratigraphy	area. Tucker, W.B., et al, [1981, p.867-878] MP 1458	CR 80-24 Electromagnetic subsurface measurements. Dean, A.M., Jr.,
Drilling and coring of frozen ground in northern Alaska, Spring 1979. Lawson, D.E., et al, [1980, 14p.]	Macroscopic view of snow deformation under a vehicle.	[1981, 19p.] SR 81-23
SR 80-12	Richmond, P.W., et al, (1981, 20p.) SR \$1-17 Sea ice drag laws and boundary layer during rapid melting.	Geophysics of subglacial geology at Dye 3, Greenland. Jezek, K.C., et al, [1985, p.105-110] MP 1941
Stream flow Drainage network analysis of a subarctic watershed. Bred-	McPhee, M.G., [1982, 17p.] CR 82-04	Subgrade preparation
thauer, S.R., et al, 1979, p.349-359 MP 1274 Watershed modeling in cold regions. Stokely, J.L., [1980,	Acoustic emissions from polycrystalline ice. St. Lawrence, W.F., et al, [1982, p.183-199] MP 1524	Influence of insulation upon frost penetration beneath pave- ments. Eaton, R.A., et al, [1976, 41p.] SR 76-06
241p. ₁ MP 1471	Deformation and failure of frozen soils and ice due to stresses. Fish, A.M., [1982, p.419-428] MP 1553	Repetitive loading tests on membrane enveloped road sections during freeze thaw. Smith, N., et al, [1977, p.171-
Clearing ice-clogged shipping channels. Vance, G.P., [1980, 13p.] CR 80-28	Stress measurements in ice. Cox, G.F.N., et al, 1983,	197 ₁ MP 962
Analysis of velocity profiles under ice in shallow streams. Calkins, D.J., et al, [1981, p.94-111] MP 1397	31p. ₁ CR 83-23 Relationship between creep and strength behavior of ice at	Winter earthwork construction in Upper Michigan. Hass, W.M., et al, [1977, 59p.] SR 77-46
Flow velocity profiles in ice-covered shallow streams. Cal-	failure. Cole, D.M., [1983, p.189-197] MP 1681 Effect of stress application rate on the creep behavior of poly-	Load tests on membrane-enveloped road sections. Smith
kina, D.J., et al, [1982, p.236-247] MP 1540 Runoff from a small subarctic watershed, Alaska. Chacho,	crystalline ice. Cole, D.M., [1983, p.454-459]	N., et al. [1978, 16p.] CR 78-12 Effects of subgrade preparation upon full depth pavement
E.F., et al, [1983, p.115-120] MP 1654 Strength	MP 1671 Evaluation of a biaxial ice stress sensor. Cox, G.F.N.,	performance in cold regions. Baton, R.A., [1978, p.459- 473] MP 1067
State of the art of ship model testing in ice. Vance, G.P.,	[1984, p.349-361] MP 1836 Preliminary investigation of thermal ice pressures. Cox,	Freeze thaw loading tests on membrane enveloped road sec-
(1981, p.693-706) MP 1573 Model tests in ice of a Canadian Coast Guard R-class ice-	G.F.N., (1984, p.221-229) MIP 1788	tions. Smith, N., et al, [1978, p.1277-1288] MP 1158
breaker. Tatinclaux, J.C., [1984, 24p.] SR 84-06	On the rheology of a broken ice field due to floe collision. Shen, H., et al., [1984, p.29-34] MP 1812	Design of airfield pavements for seasonal frost and permafros conditions. Berg, R.L., et al, (1978, 18p.) MP 1189
itress concentration Flexural strength of ice on temperate lakes. Gow, A.J., et al,	Secondary stress within the structural frame of DYE-3: 1978-	Construction of temporary airfields in NPRA. Crory, F.E.
(1978, 14p.) CR 78-09 Street strain diagrams	1983. Ueda, H.T., et al, [1984, 44p.] SR 84-26 In-ice calibration tests for an elongated, uniaxial brass ice	[1978, p.13-15] MP 1253 Full-depth payement considerations in seasonal frost areas.
Resiliency of silt under asphalt during freezing and thawing.	stress sensor. Johnson, J.B., [1985, p.244-249] MIP 1859	Eaton, R.A., et al, [1979, 24p.] MIP 1188
Johnson, T.C., et al, [1978, p.662-668] MP 1106 Polycrystalline ice mechanics. Hooke, R.L., et al, [1979,	Effect of size on stresses in shear flow of granular materials,	Subgrade soils Resiliency in cyclically frozen and thawed subgrade soils
16p. ₁ MP 1207	Pt.2. Shen, H.H., [1985, 20p.] CR 85-03 Creep of a strip footing on ice-rich permafrost. Sayles, F.H.,	Chamberlain, E.J., et al. (1977, p.229-281) MIP 1724
Grouting silt and sand at low temperatures. Johnson, R., (1979, p.937-950) MP 1078	[1985, p.29-51] MP 1731 Experience with a biaxial ice stress sensor. Cox, G.F.N.,	Effect of freeze-thaw cycles on resilient properties of fine grained soils. Johnson, T.C., et al, (1978, 19p.)
Acoustic emission response of snow. St. Lawrence, W.F., [1980, p.209-216] MP 1366	[1985, p.252-258] MP 1937	MP 100: Resiliency of subgrade soils during freezing and thawing
Strength of frozen silt as a function of ice content and dry unit	Kadluk ice stress measurement program. Johnson, J.B., et al, [1985, p.88-100] MP 1899	Johnson, T.C., et al, [1978, 59p.] CR 78-23
weight. Sayles, F.H., et al, [1980, p.109-119] MIP 1451	Constitutive relations for a planar, simple shear flow of rough diaks. Shen, H.H., et al, 1985, 17p., CR 85-20	Resilient response of two frozen and thawed soils. Chamber- lain, B.J., et al, [1979, p.257-271] MP 1176
Mechanical properties of polycrystalline ice. Hooke, R.L., et al, (1980, p.263-275) MP 1328	Repeated load triaxial testing of frozen and thawed soils.	Preeze thaw effect on resilient properties of fine soils. John
Cyclic loading and fatigue in ice. Mellor, M., et al, [1981,	Cole, D.M., et al, (1985, p.166-170) MP 2068 Structural analysis	son, T.C., et al, [1979, p.247-276] MP 1224 Pavement deflection after freezing and thawing. Chamber
Constitutive relation for the deformation of snow. St. Law-	Structural evaluation of porous pavement in cold climate.	lain, E.J., [1981, 10p.] CR \$1-15
rence, W.F., et al, [1981, p.3-14; MP 1370 Ice behavior under constant stress and strain. Mellor, M., et	Eaton, R.A., et al, [1980, 43p.] SR 80-39 Structures	Effect of freezing and thawing on resilient modulus of granu- lar soils. Cole, D.M., et al, [1981, p.19-26]
	De-icing using lasers. Lane, J.W., et al, [1976, 25p.] CR 76-10	MP 1484 Pull-depth and granular base course design for frost areas
al, [1982, p.201-219] MP 1525 Glacier mechanics. Mellor, M., [1982, p.455-474] MP 1532	Ice cover forces on structures. Kerr, A.D., [1978, p.123-	Eaton, R.A., et al, [1983, p.27-39] MP 1492
Stress/strain/time relations for ice under uniaxial compression. Mellor, M., et al. [1983, p.207-230] MP 1587	134 ₁ MP 879 Cost of ice damage to shoreline structures during navigation.	Laboratory tests and analysis of thermosyphons with inclined evaporator sections. Zarling, J.P., et al. (1985, p.31-37)
Polycrystalline ice creep in relation to applied stresses. Cole,	Carey, K.L., [1980, 33p.] SR 80-22	MP 1653
D.M., [1983, p.614-621] MP 1582 Creep behavior of frozen silt under constant uniaxial stress.	Icing on structures. Minsk, L.D., [1980, 18p.] CR 80-31	Pavement recycling using a heavy bulldozer mounted pulver
Zhu, Y., et al, [1983, p.1507-1512] MP 1805 Compressive strength of frozen silt. Zhu, Y., et al, [1984,	Force measurements and analysis of river ice break up. Deck, D.S., [1982, p.303-336] MP 1739	izer. Eaton, R.A., et al, [1977, 12p. + appends.] SR 77-30
	Uniform snow loads on structures. O'Rourke, M.J., et al,	Sublimation
p.3-15 ₁ MP 1773		
p.3-15 ₂ MP 1773 Thermodynamic model of creep at constant stress and con- stant strain rate. Fish, A.M., [1984, p.143-161 ₂	(1982, p.2781-2798) MP 1574 Experiments on ice ride-up and pile-up. Sodhi, D.S., et al,	Sublimation and its control in the CRREL permafrost tunnel. Johansen, N.I., [1981, 12p.] SR 81-66
p.3-15; MP 1773 Thermodynamic model of creep at constant stress and con-		

Subsea permatrost	Subsurface drainage	Constitutive relations for a planar, simple shear flow of rough
Delineation and engineering characteristics of permafrost	Solving problems of ice-blocked drainage facilities. Carey, K.L., [1977, 17p.] SR 77-25	disks. Shen, H.H., et al. [1985, 17p.] CR 88-20
beneath the Beaufort Sea. Selimann, P.V., et al., [1976, p.391-408] MP 1377	Drainage and frost action criteria for a pavement design.	Leboratory and field studies of ice friction coefficient. Tatin- claux, J.C., et al, (1986, p.389-400) MP 2126
Operational report: 1976 USACRREL-USGS subsea perma- frost program Beaufort Sea, Alaska. Sellmann, P.V., et al,	Berg, R.L., (1979, 51p.) SR 79-15	Surface structure
(1976, 20p.) SR 76-12	Subsurface investigations Subsurface explorations in permafrost areas. Cass, J.R., Jr.,	Airborne E-phase resistivity surveys of permafrost. Sell- mann, P.V., et al. [1974, p.67-71] MP 1046
Delineation and engineering characteristics of permafrost	[1959, p.31-41] MP 885	Light-colored surfaces reduce thaw penetration in permafrost.
beneath the Beaufort Sca. Selimann, P.V., et al, (1976, p.53-60) MIP 919	Remote sensing of massive ice in permafrost along pipelines in Alaska. Kovacs, A., et al, [1979, p.268-279]	Berg, R.L., et al., [1977, p.86-99] MP 954 Surface temperature
Delineation and engineering characteristics of permafrost	MP 1175	Messuring building R-values for large areas. Flanders, S.N.,
beneath the Beaufort Sea. Seilmann, P.V., et al. (1977, p.234-237) MIP 927	Asymmetric flows: application to flow below ice jams. Gögüs, M., et al, [1981, p.342-350] MP 1733	et al, [1981, p.137-138] MP 1369
Delineation and engineering characteristics of permafrost	Distortion of model subsurface radar pulses in complex die-	Transient heat flow and surface temperatures of a built-up roof. Korhonen, C., [1983, 20p.] SR 83-22
beneath the Beaufort Sea. Sellmann, P.V., et al, (1977, p.385-395) MP 1974	lectrics. Arcone, S.A., [1981, p.855-864] MP 1472 Radar profiling of buried reflectors and the groundwater table.	Effect of color and texture on the surface temperature of
Delineation and engineering characteristics of permafrost	Selimann, P.V., et al, [1983, 16p.] CR 83-11	ssphait concrete pavements. Berg, R.L., et al, (1983, p.57-61; MP 1652
beneath the Beaufort Sea. Sellmann, P.V., et al, (1977, p.432-440) MP 1077	Analysis of wide-angle reflection and refraction measure- ments. Morey, R.M., et al, [1985, p.53-60]	Increased heat flow due to snow compaction: the simplistic
1977 CRREL-USGS permafrost program Beaufort Ses, Alas-	MP 1953	approach. Colbeck, S.C., (1983, p.227-229) MP 1693
ka, operational report. Sellmann, P.V., et al, [1977, 19p.] SE 77-41	Subsurface structures On the spinion of singers, a community Markon I.B. 1976	Time-lapse thermography: a unique electronic imaging ap-
Delineation and engineering characteristics of permafrost	On the origin of pingos—a comment. Mackay, J.R., [1976, p.295-298] MP 916	plication. Marshall, S.J., et al, [1984, p.84-88] MIP 2103
beneath the Beaufort Sea. Sellmann, P.V., et al. (1977, p.518-521) MP 1201	Block motion from detonations of buried near-surface explo-	Suspended sediments
Engineering properties of submarine permafrost near Prudhoe	sive arrays. Blouin, S.E., [1980, 62p.] CR 80-26 Supercooled fog	Correlation and quantification of airborne spectrometer data to turbidity measurements at Lake Powell, Utah. Merry,
Bay. Chamberlain, E.J., et al, [1978, p.629-635] MIP 1104	Compressed air seeding of supercooled fog. Hicks, J.R.,	C.J., [1970, p.1309-1316] MIP 1271
Chemistry of interstitial water from subsea permafrost,	[1976, 9p.] SR 76-09 Use of compressed air for supercooled fog dispersal. Wein-	Baseline data on tidal flushing in Cook Inlet, Alasks. Gatto, L.W., (1973, 11p.) MP 1523
Prudhoe Bay, Alaska. Iskandar, I.K., et al, [1978, p.92- 98; MP 1385	stein, A.I., et al, [1976, p.1226-1231] MP 1614	Remote sensing of water quality using an airborne spec-
98 ₁ MP 1385 Geochemistry of subsea permafrost at Prudhoe Bay, Alaska.	Laboratory studies of compressed air seeding of supercooled fog. Hicks, J.R., et al, [1977, 19p.] SR 77-12	troradiometer. McKim, H.L., et al, [1980, p.1353-1362]
Page, F.W., et al, [1978, 70p.] SR 78-14	Ice crystal formation and supercooled fog dissipation.	MP 1491 Ice distribution and water circulation, Kachemak Bay, Alaska.
Permafrost beneath the Beaufort Sea. Selimann, P.V., et al, [1978, p.50-74] MP 1206	Kumai, M., [1982, p.579-587] MP 1539	Gatto, L.W., [1982, p.421-435] MP 1569
Permafrost beneath the Beaufort Sea, near Prudhoe Bay,	Mechanical ice relesse from high-speed rotors. Itagaki, K., [1983, 8p.] CR 83-26	Water quality monitoring using an airborne spectroradiometer. McKim, H.L., et al, [1984, p.353-360]
Alaska. Sellmann, P.V., et al, [1979, p.1481-1493] MP 1211	Supercooled water	MP 1718
Penetration tests in subsea permafrost, Prudhoe Bay, Alaska.	Apparent anomaly in freezing of ordinary water. Swinzow, G.K., [1976, 23p.] CR 76-20	Synoptic meteorology
Blouin, S.E., et al, [1979, 45p.] CR 79-07	Frazil ice formation in turbulent flow. Müller, A., et al.	Synoptic meteorology during the SNOW-ONE field experiment. Bilello, M.A., [1981, 55p.] SR 81-27
Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al,	(1978, p.219-234) MIP 1135	Synoptic weather conditions during snowfall, Dec. 1981-Feb.
(1979, p.3-16) MP 1217	Supercooling Heat and mass transfer from freely falling drops at low tem-	1982. Bilello, M.A., [1982, p.9-42] MP 1559 Synoptic meteorology during the SNOW-ONE-A Field Ex-
Subsea permafrost study in the Beaufort Sea, Alaska. Sell- mann, P.V., et al, [1979, p.207-213] MP 1591	peratures. Zarling, J.P., [1980, 14p.] CR 80-18	periment. Bilello, M.A., [1983, 80p.] SR 83-10
Permafrost distribution on the continental shelf of the Beau-	Phase equilibrium in frost heave of fine-grained soil. Naka- no, Y., et al, {1985, p.50-68 ₁ MP 1896	Site-specific and synoptic meteorology. Bates, R.E., r1983, p.13-80; MP 1845
fort Sea. Hopkins, D.M., et al, [1979, p.135-14], MP 1288	Supersaturation	Systems analysis
Distribution and properties of subsea permafrost of the Beau-	Ice crystal morphology and growth rates at low supersatura-	Systems study of snow removal. Minsk, L.D., [1979, p.220-
fort Sea. Sellmann, P.V., et al, [1979, p.93-115, MP 1287	tions and high temperatures. Colbeck, S.C., 1983, p.2677-2682; MP 1537	225 ₁ MP 1237 Tanks (combat vehicles)
Features of permafrost beneath the Beaufort Sea. Sellmann,	Supports	Change in orientation of artillery-delivered anti-tank mines in
P.V., et al, [1980, p.103-110] MIP 1344	Flexural strength of ice on temperate lakes. Gow, A.J., et al, [1978, 14p.] CR 78-09	snow. Bigl, S.R., [1984, 20p.] CR 84-29 Review of antitank obstacles for winter use. Richmond,
Permafrost beneath the Beaufort Sea: near Prudhoe Bay, Alaska. Sellmann, P.V., et al, (1980, p.35-48)	Surface drainage	P.W., (1984, 12p.) CR 84-25
MP 1346	Land treatment of wastewaters. Reed, S.C., et al, [1974, p.12-13] MP 1036	Tank B/O sensor system performance in winter: an overview.
Distribution and features of bottom sediments in Alaskan coastal waters. Sellmann, P.V., [1980, 50p.]	Land treatment of wastewaters for rural communities. Reed,	Lacombe, J., et al. [1985, 26p.] MP 2073 Tunks (containers)
SR 80-15	S.C., et al., [1975, p.23-39] MP 1399 Solving problems of ice-blocked drainage facilities. Carey,	Potential icing of the space shuttle external tank. Ferrick,
Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance. Tice, A.R., et al, [1980,	K.L., (1977, 17p.) SR 77-25	M.G., et al, [1982, 305p.] CR 82-25 Talecommunication
p.400-412 ₁ MP 1412	Drainage facilities of airfields and heliports in cold regions. Lobacz, E.F., et al, [1981, 56p.; SR 81-22	Transfer of meteorological data from mountain-top sites.
Characteristics of permafrost beneath the Beaufort Sea. Sell- mann, P.V., et al., r1981, p.125-157; MP 1428	Surface properties	Govoni, J.W., et al, [1986, 6p.] MP 2107 Temperature distribution
Delineation and engineering of subsea permafrost, Beaufort	CRREL instrumented vehicle for cold regions mobility meas-	
Sea. Sellmann, P.V., et al, (1981, p.137-156)	received Blaicell GT 1000 11s MCB 1818	Preezing of soil with phase change occurring over a finite
	urements. Blaisdell, G.L., (1982, 11p.) MP 1515	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46)
Foundations of structures in polar waters. Chamberlain,	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, E.L., [1982, 18p.] CR 82-12	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-46] MP 1884
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J.,	Prezzing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-46] MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes,
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] Six 81-24	urements. Blaisdell, G.L., [1922, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1922, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRRBL instrumented vehicle: hardware and software.	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46) MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al. (1977, 27p.) CR 77-63
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] Six 81-24 Understanding the Arctic sea floor for engineering purposes.	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. [1982, p.205-212] MP 1595 CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-03	Prezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46) MP 1854 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., (1977, 27p.) Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., (1977, 15p.) SE 77-23 SE 77-23
Foundations of structures in polar waters. Chamberlain, SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes. [1982, 141p.] SR 83-25	urements. Blaisdell, G.L., [1922, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1922, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] CRRBL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-03 Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48]	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46) MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Laynes, F.D., et al., (1977, 27p.) Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., (1977, 15p.) Ice accretion on ships. Hazaki, K., (1977, 22p.)
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] Understanding the Arctic sea floor for engineering purposes. [1982, 141p.] Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.]	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-03 Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] MP 1672 Climatic factors in cold regions surface conditions. Bilello,	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-46] **Representative effects **Biffect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] **Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., [1977, 15p.] **SR 77-23* **Item of temperature and strain rate on the strength of polymers.
Foundations of structures in polar waters. Chamberlain, SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes, [1982, 141p.] SR 83-25 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et CR 82-24 Seismic velocities and subsea permafrost in the Beaufort Sea,	urements. Blaisdell, G.L., [1922, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1922, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRRBL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-03 Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] Field tests of the kinetic friction coefficient of sea ice. Tatin-	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46) MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Laynes, F.D., et al., (1977, 27p.) CR 77-63 Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., (1977, 15p.) SR 77-23 Ice accretion on ships. Itagaki, K., (1977, 22p.) SR 77-27 Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., (1977, p.107-111)
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] Understanding the Arctic sea floor for engineering purposes. [1982, 141p.] Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al, [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al, [1983, p.894-898] MP 1665	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-03 Implications of surface energy in ice adhesion. [1983, p.41-48] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1961 Field tests of the kinetic friction coefficient of sea ice. Tatinciaux, J.C., et al, [1985, 20p.] CR 85-17	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-46] **Representative effects **Biffect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] **Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., [1977, 15p.] **SR 77-23* **Item of temperature and strain rate on the strength of polymers.
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes. [1982, 141p.] SR 83-25 Subsea permaftost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] CR 82-24 Seismic velocities and subsea permaftost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, p.894-898] MP 1665 Determining distribution patterns of ice-bonded permaftost in	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRRBL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-03 Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] Field tests of the kinetic friction coefficient of sea ice. Tatinclaux, J.C., et al, [1985, 20p.] Surface roughases Remote sensing program required for the AIDJEX model.	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46). MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., [1977, 15p.] Ice accretion on ships. Itagaki, K., [1977, 22p.] Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., [1977, p.107-111] Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., [1978, p.146-158] MP 1063
Foundations of structures in polar waters. Chamberlain, SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p., SR 81-24 Understanding the Arctic sea floor for engineering purposes, [1982, 141p., SR 83-25 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p., CR 82-24 Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, p.894-898] MP 1645 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] MP 1839	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] Climatic factors in cold regions surface conditions. Biello, MA., [1985, p.508-517] Field tests of the kinetic friction coefficient of sea ice. Tatinclaux, J.C., et al., [1985, 20p.] Surface reaghases Remote sensing program required for the AIDJEX model. Weeks, W.F., et al., [1974, p.22-44] MP 1640	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-46]. MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., [1977, 15p.] SR 77-23 Ice accretion on ships. Itagaki, K., [1977, 22p.] Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., [1977, p.107-111] Temperature effects in compacting an asphalt concrete over-
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] Understanding the Arctic sea floor for engineering purposes. (1982, 141p.) SR 83-25 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, p.894-898] MP 1665 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] Subsea permafrost distribution on the Alaskan sheff. Sell-	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRRBL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-03 Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] Field tests of the kinetic friction coefficient of sea ice. Tatinclaux, J.C., et al, [1985, 20p.] Surface roughases Remote sensing program required for the AIDJEX model.	Prezzing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46) MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., (1977, 27p.) CR 77-63 Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., (1977, 15p.) E8 77-23 Ice accretion on ships. Itagaki, K., (1977, 22p.) SR 77-27 Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., (1977, p.107-111) Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., (1978, p.146-158) MP 1063 Thermal and load-associated distress in pavements. Johnson, T.C., et al., (1978, p.403-437) MP 1299 Effect of temperature on the strength of snow-ice. Haynes,
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes, [1982, 141p.] SR 83-25 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, p.894-898] MP 1665 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.275-258] Subsea permafrost distribution on the Alaskan shelf. MP 1839 Mapping resistive seabed features using DC methods. Sell-	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1961 Field tests of the kinetic friction coefficient of sea ice. Tatinclaux, J.C., et al., [1985, 20p.] Surface roughness Remote sensing program required for the AIDJEX model. Weeks, W.F., et al., [1976, 25p.] Thickness and roughness variations of arctic multiyear sea ice. Ackley, S.F., et al., [1976, 25p.] Sea ice roughness and floe geometry over continental shelves.	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-46] MP 1854 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al, [1977, 27p.] Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al, [1977, 15p.] SR 77-23 Ice accretion on ships. Itagaki, K., [1977, 22p.] Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., [1977, p.107-111] Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al, [1978, p.146-158] MP 1023 Thermal and load-associated distress in pavements. Johnson, T.C., et al, [1978, p.403-437] Effect of temperature on the strength of snow-ice. Haynes, F.D., [1978, 25p.] CR 78-27
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] Understanding the Arctic sea floor for engineering purposes. (1982, 141p.) SR 83-25 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, p.894-898] MP 1665 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] Subsea permafrost distribution on the Alaskan sheff. Sellmann, P.V., et al., [1984, p.75-82] Mapping resistive seabed features using DC methods. Sellmann, P.V., et al., [1985, p.136-147] MP 1918	urements. Blaisdell, G.L., [1922, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRRBL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] Serface regions from the first of the cold regions of the cold regions of arctic multiyear sea from the cold regions of arctic multiyear sea ice. Ackley, S.F., et al, [1976, 25p.] CR 76-18	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46) MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al. (1977, 27p.) CR 77-63 Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., (1977, 15p.) Ice accretion on ships. Itagaki, K., (1977, 22p.) Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., (1977, p.107-111) Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., (1978, p.403-437) MP 1063 Thermal and load-associated distress in pavements. Johnson, T.C., et al., (1978, p.403-437) MP 1093 Effect of temperature on the strength of snow-ice. Haynes, F.D., (1978, 25p.) Laboratory experiments on icing of rotating blades. Ackley, MP 1236 MP 1236
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes, [1982, 141p.] SR 83-25 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, p.894-898] MP 1665 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.275-258] Subsea permafrost distribution on the Alaskan shelf. MP 1839 Mapping resistive seabed features using DC methods. Sell-	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRRBL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] Climatic factors in cold regions surface conditions. Billello, M.A., [1985, p.508-517] MP 1961 Field tests of the kinetic friction coefficient of sea ice. Tatinciaux, J.C., et al., [1978, 20p.] Surface reaghases Remote sensing program required for the AIDJEX model. Weeks, W.F., et al., [1976, 25p.] Sea ice roughness and floe geometry over continental shelfs. Sea ice roughness and floe geometry over continental shelfs. Sea ice roughness and floe geometry over continental shelfs. Weeks, W.F., et al., [1977, p.32-41] MP 1163 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al., [1979, 24p.] CR 79-06	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-46] MP 1854 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., [1977, 15p.] SR 77-23 Ice accretion on ships. Itagaki, K., [1977, 22p.] Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., [1977, p.107-111] Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., [1978, p.146-158] MP 1127 Temperature of the strength of snow-ice. Ison, T.C., et al., [1978, p.403-437] MP 1209 Effect of temperature on the strength of snow-ice. Haynes, F.D., [1978, 25p.] CR 78-27 Laboratory experiments on icing of rotating blades. Ackley, S.F., et al., [1979, p.85-92] River ice. Ashton, G.D., [1979, p.38-45] MP 1178
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes, [1982, 141p.] SR 83-25 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, 9894-898] MP 1665 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] Subsea permafrost distribution on the Alaskan shelf. Sellmann, P.V., et al., [1984, p.75-82] Mapping resistive seabed features using DC methoda. Sellmann, P.V., et al., [1985, p.136-147] MP 1918 Seismic surveys of shallow subsea permafrost. Neave, K.G., MP 1985, Calvanic methods for mapping resistive seabed features.	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] Field tests of the kinetic friction coefficient of sea ice. Tatinclaux, J.C., et al., [1985, 20p.] CR 85-17 Surface reughases Remote sensing program required for the AIDJEX model. Weeks, W.P., et al., [1974, p.22-44] MP 1940 Thickness and roughases variations of arctic multiyear sea ice. Ackley, S.F., et al., [1976, 25p.] Sea ice roughases and floe geometry over continental shelves. Weeks, W.P., et al., [1977, p.32-41] MP 1163 Sea ice ridging over the Alaskan continental shelf. Tucker,	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46) MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al. (1977, 27p.) CR 77-63 Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., (1977, 15p.) Ice accretion on ships. Itagaki, K., (1977, 22p.) Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., (1977, p.107-111) Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., (1978, p.403-437) MP 1063 Thermal and load-associated distress in pavements. Johnson, T.C., et al., (1978, p.403-437) MP 1093 Effect of temperature on the strength of snow-ice. Haynes, F.D., (1978, 25p.) Laboratory experiments on icing of rotating blades. Ackley, MP 1236 MP 1236
Foundations of structures in polar waters. Chamberlain, SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes, [1982, 141p.] SR 83-25 Subsea permafrost in Harrison Bay, Alsaka. Neave, K.G., et al., [1982, 62p.] CR 22-24 Seismic velocities and subsea permafrost in the Beaufort Sea, Alsaka. Neave, K.G., et al., [1983, p.894-898] MP 1665 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] MP 1852 Mapping resistive seabed features using DC methods. Sell-mann, P.V., et al., [1985, p.136-147] MP 1852 Seismic surveys of shallow subsea permafrost. Neave, K.G., et al., [1985, p.61-65] Galvanic methods for mapping resistive seabed features Sellmann, P.V., et al., [1985, p.91-92] MP 1955	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRRBL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1961 Field tests of the kinetic friction coefficient of sea ice. Tatinciaux, J.C., et al, [1985, 20p.] CR 85-17 Surface reaghases Remote sensing program required for the AIDJEX model. Weeks, W.F., et al, [1974, p.22-44] MP 1940 Thickness and roughness variations of arctic multiyear sea ice. Ackley, S.F., et al, [1976, 25p.] CR 76-18 Sea ice roughness and floe geometry over continental shelves. Weeks, W.F., et al, [1977, p.32-41] MP 1163 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al, [1979, p.4885-4897]. CR 78-06 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al, [1979, p.4885-4897]. CR 78-06 Measurement of the shear stress on the underside of simulated	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-45] MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., [1977, 15p.] SR 77-23 Ice accretion on ships. Itagaki, K., [1977, 22p.] Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., [1977, p.107-111] Temperature effects in compacting an asphalt concrete overlay. Baton, R.A., et al., [1978, p.146-158] MP 1023 Thermal and load-associated distress in pavements. Johnson, T.C., et al., [1978, p.403-437] MP 1209 Effect of temperature on the strength of snow-ice. Haynes, F.D., [1978, 25p.] Laboratory experiments on icing of rotating blades. Ackley, S.F., et al., [1979, p.35-92] Live rice. Ashton, G.D., [1979, p.38-45] Low temperature phase changes in moist, briny clays. Anderson, D.M., et al., [1980, p.139-144] Practure behavior of ice in Charpy impact testing. Itagaki, Fracture behavior of ice in Charpy impact testing. Itagaki, Practure behavior of ice in Charpy impact testing. Itagaki, P. Ind. [1980]
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes, [1982, 141p.] SR 83-25 Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, 9894-898] MP 1665 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] Subsea permafrost distribution on the Alaskan shelf. Sellmann, P.V., et al., [1984, p.75-82] Mapping resistive seabed features using DC methods. Sellmann, P.V., et al., [1985, p.136-147] MP 1918 Seismic surveys of shallow subsea permafrost. Neave, K.G., et al., [1985, p.61-65] Galvanic methods for mapping resistive seabed features. Sellmann, P.V., et al., [1985, p.91-92] MP 1955 Freeze thaw consolidation of sediments, Beaufort Sea, Alaska. Lee, H.J., et al., [1985, 33p.] MP 2625	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] Field tests of the kinetic friction coefficient of sea ice. Tatinclaux, J.C., et al., [1985, 20p.] CR 85-17 Surface reaghases Remote sensing program required for the AIDJEX model. Weeks, W.F., et al., [1974, p.22-44] MP 1640 Thickness and roughness variations of arctic multiyear sea ice. Ackley, S.F., et al., [1976, 25p.] Sea ice roughness and floe geometry over continental shelf. CR 76-18 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al., [1979, 248-3-4897] MP 1240	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., (1985, p.38-46) MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., (1977, 27p.) CR 77-63 Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., (1977, 15p.) Ice accretion on ships. Hagaki, K., (1977, 22p.) Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., (1977, p.107-111) Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., (1978, p.104-158) MP 1063 Thermal and load-associated distress in pavements. Johnson, T.C., et al., (1978, p.403-437) MP 1209 Effect of temperature on the strength of snow-ice. Haynes, F.D., (1976, 25p.) Laboratory experiments on icing of rotating blades. Ackley, S.F., et al., (1979, p.85-92) MP 1236 River ice. Ashton, G.D., (1979, p.38-45) MP 1178 Low temperature phase changes in moist, briny clays. Anderson, D.M., et al., (1980, p.139-144) MP 1339
Foundations of structures in polar waters. Chamberlain, B.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes, [1982, 141p.] SR 83-25 Subsea permafrost in Harrison Bay, Alsaka. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alsaka. Neave, K.G., et al., [1983, p.894-898] MP 1665 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] Subsea permafrost distribution on the Alsakan shelf. Soilmann, P.V., et al., [1984, p.75-82] MP 1852 Mapping resistive seabed features using DC methods. Seilmann, P.V., et al., [1985, p.136-147] MF 1918 Seismic surveys of shallow subsea permafrost. Neave, K.G., et al., [1985, p.136-147] MP 1954 Galvanic methods for mapping resistive seabed features. Seilmann, P.V., et al., [1985, p.91-92] MP 1955 Freeze thaw consolidation of sediments, Beaufort Sea, Alaska. Lee, H.J., et al., [1985, 83p.] MP 2025	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] Mp 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1961 Field tests of the kinetic friction coefficient of sea ice. Tatinciaux, J.C., et al., [1985, 20p.] CR 85-17 Surface resphases Remote sensing program required for the AIDJEX model. Weeks, W.F., et al., [1974, p.22-44] MP 1640 Thickness and roughness variations of arctic multiyear sea ice. Ackley, S.F., et al., [1976, 25p.] Sea ice roughness and floe geometry over continental shelf. Tucker, W.B., et al., [1979, 24p.] CR 79-06 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al., [1979, p.4885-4897] CR 79-06 Measurement of the shear stress on the underside of simulated ice covers. Calkins, D.J., et al., [1980, 11p.) CR 80-24 Analysis of velocity profiles under ice in shallow streams.	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-45] MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., [1977, 15p.] SR 77-23 Ice accretion on ships. Itagaki, K., [1977, 22p.] Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., [1977, p.107-111] Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., [1978, p.146-158] Thermal and load-associated distress in pavements. Johnson, T.C., et al., [1978, p.403-437] MP 1239 Effect of temperature on the strength of snow-ice. Haynes, F.D., [1978, 25p.] Laboratory experiments on icing of rotating blades. Ackley, S.F., et al., [1979, p.85-92] Low temperature phase changes in moist, briny clays. Anderson, D.M., et al., [1980, p.139-144] Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., [1980, 13p.] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance. Tice, A.R., et al., [1980,
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25. Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24. Understanding the Arctic sea floor for engineering purposes. [1982, 141p.] SR 83-25. Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, p.894-898] MP 1665. Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] Subsea permafrost distribution on the Alaskan shelf. Sellmann, P.V., et al., [1984, p.75-82] Mapping resistive seabed features using DC methods. Seilmann, P.V., et al., [1985, p.136-147] MP 1918. Seismic surveys of shallow subsea permafrost. Neave, K.G., et al., [1985, p.61-65] Galvanic methods for mapping resistive seabed features. Sellmann, P.V., et al., [1985, p.91-92] MP 1955. Freeze thaw consolidation of sediments, Beaufort Sea, Alaska. Lee, H.J., et al., [1985, 83p.] Subsideace Slumping failure of an Alaskan earth dam. Collina, C.M., et al., [1977, 21p.)	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRRBL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1961 Field tests of the kinetic friction coefficient of sea ice. Tatinciaux, J.C., et al, [1985, 20p.] CR 85-17 Surface reaghases Remote sensing program required for the AIDJEX model. Weeks, W.F., et al, [1974, p.22-44] MP 1940 Thickness and roughness variations of arctic multiyear sea ice. Ackley, S.F., et al, [1976, 25p.] CR 76-18 Sea ice roughness and floe geometry over continental shelves. Weeks, W.F., et al, [1977, p.32-41] MP 1163 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al, [1979, p.4885-4897]. CR 78-06 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al, [1979, p.4885-4897]. CR 78-06 Measurement of the shear stress on the underside of simulated ice covers. Calkins, D.J., et al, [1981, p.94-111] MP 1397 Asymmetric flows: supolication to flow below ice isms.	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-45] **Representative of the strength of frozen silt.** **F.D., et al. [1977, 27p.] **Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al. [1977, 15p.] **Stallman, P.E., et al. [1977, 15p.] **Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., [1977, p.107-111] **Temperature effects in compacting an asphalt concrete overlay. Baton, R.A., et al. [1978, p.146-158] **Thermal and load-associated distress in pavements. Johnson, T.C., et al. [1978, p.403-437] **Effect of temperature on the strength of snow-ice. Haynes, F.D., [1976, 25p.] **Laboratory experiments on icing of rotating blades. Ackley, S.F., et al., [1979, p.85-92] **River ice. Ashton, G.D., [1979, p.38-45] **Low temperature phase changes in moist, briny clays. Anderson, D.M., et al., [1980, p.139-144] **Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., [1980, 13p.] **Unfrozen water contents of submarine permafrost determinade by nuclear magnetic resonance. Tice, A.R., et al., [1980, 13p.] **Unfrozen water contents of submarine permafrost determinade by nuclear magnetic resonance. Tice, A.R., et al., [1980, 13p.]
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes, [1982, 141p.] SR 83-25 Subsea permafrost in Harrison Bay, Alsaka. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permafrost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, p.894-898] Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] MP 1645 Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] MP 1839 Subsea permafrost distribution on the Alaskan shelf. Sellmann, P.V., et al., [1985, p.136-147] MP 1918 Seismic surveys of shallow subses permafrost. Neave, K.G., et al., [1985, p.51-65] Galvanic methods for mapping resistive seabed features. Sellmann, P.V., et al., [1985, p.91-92] MP 1955 Freeze thaw consolidation of sediments, Beaufort Sea, Alaska. Lee, H.J., et al., [1985, 939.] Subsidiance Slumping failure of an Alaskan earth dam. Collina, C.M., et al., [1977, 21p.] Human-induced thermokarst at old drill sites in northern	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-03 Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1961 Field tests of the kinetic friction coefficient of sea ice. Tatinciaux, J.C., et al., [1985, 20p.] CR 85-17 Surface resphases Remote sensing program required for the AIDJEX model. Weeks, W.F., et al., [1974, p.22-44] MP 1640 Thickness and roughness variations of arctic multiyear sea ice. Ackley, S.F., et al., [1976, 25p.] Sea ice roughness and floe geometry over continental shelf. Tucker, W.B., et al., [1979, 24p.] Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al., [1979, p.4885-4897] Measurement of the shear stress on the underside of simulated ice covers. Calkins, D.J., et al., [1981, p.94-111] Analysis of velocity profiles under ice in shallow streams. Calkins, D.J., et al., [1981, p.94-111] MP 1393 Asymmetric flows: application to flow below ice jama. Ocgus, M., et al., [1981, p.342-330]	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-45] MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., [1977, 15p.] SR 77-23 Ice accretion on ships. Itagaki, K., [1977, 22p.] Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., [1977, p.107-111] Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., [1978, p.146-158] MP 1127 Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., [1978, p.146-158] MP 1289 Effect of temperature on the strength of snow-ice. Haynes, F.D., [1978, 25p.] CR 78-27 Laboratory experiments on icing of rotating blades. Ackley, S.F., et al., [1979, p.85-92] CR 78-27 Low temperature phase changes in moist, briny clays. Anderson, D.M., et al., [1980, p.139-144] MP 1138 Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., [1980, 13p.] Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance. Tice, A.R., et al., [1980, p.400-412] Pield cooling rates of asphalt concrete overlays at low temperatures. Eaton, R.A., et al., [1980, 11p.] CR 86-38
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25. Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24. Understanding the Arctic sea floor for engineering purposes. [1982, 141p.] SR 83-25. Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] MP 1665. Determining distribution patterns of ice-bonded permafrost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.237-258] Subsea permafrost distribution on the Alaskan shelf. Sellmann, P.V., et al., [1984, p.75-82] Mp 1852. Mapping resistive seabed features using DC methoda. Sellmann, P.V., et al., [1985, p.136-147] MP 1852. Seismic surveys of shallow subsea permafrost. Neave, K.G., et al., [1985, p.61-65] Galvanic methods for mapping resistive seabed features. Sellmann, P.V., et al., [1985, p.91-92] MP 1955. Freeze thaw consolidation of sediments, Beaufort Sea, Alaska. Lee, H.J., et al., [1985, 33p.] Subsideace Slumping failure of an Alaskan earth dam. Collina, C.M., et al., [1977, 21p.) Human-induced thermokarst at old drill sites in northern Alaska. Lawson, D.E., et al., [1978, p.16-23) MP 1254	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRRBL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1961 Field tests of the kinetic friction coefficient of sea ice. Tatinciaux, J.C., et al, [1985, 20p.] CR 85-17 Surface reaghases Remote sensing program required for the AIDJEX model. Weeks, W.F., et al, [1974, p.22-44] MP 1940 Thickness and roughness variations of arctic multiyear sea ice. Ackley, S.F., et al, [1976, 25p.] CR 76-18 Sea ice roughness and floe geometry over continental shelves. Weeks, W.F., et al, [1977, p.32-41] MP 1163 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al, [1979, p.4885-4897]. CR 78-06 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al, [1979, p.4885-4897]. CR 78-06 Measurement of the shear stress on the underside of simulated ice covers. Calkins, D.J., et al, [1981, p.94-111] MP 1397 Asymmetric flows: supolication to flow below ice isms.	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-45] **Representative of the strength of frozen silt.** **F.D., et al. [1977, 27p.] **Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al. [1977, 15p.] **Stallman, P.E., et al. [1977, 15p.] **Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, F.D., [1977, p.107-111] **Temperature effects in compacting an asphalt concrete overlay. Baton, R.A., et al. [1978, p.146-158] **Thermal and load-associated distress in pavements. Johnson, T.C., et al. [1978, p.403-437] **Effect of temperature on the strength of snow-ice. Haynes, F.D., [1976, 25p.] **Laboratory experiments on icing of rotating blades. Ackley, S.F., et al., [1979, p.85-92] **River ice. Ashton, G.D., [1979, p.38-45] **Low temperature phase changes in moist, briny clays. Anderson, D.M., et al., [1980, p.139-144] **Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., [1980, 13p.] **Unfrozen water contents of submarine permafrost determinade by nuclear magnetic resonance. Tice, A.R., et al., [1980, 13p.] **Unfrozen water contents of submarine permafrost determinade by nuclear magnetic resonance. Tice, A.R., et al., [1980, 13p.]
Foundations of structures in polar waters. Chamberlain, E.J., [1981, 16p.] SR 81-25 Site investigations and submarine soil mechanics in polar regions. Chamberlain, E.J., [1981, 18p.] SR 81-24 Understanding the Arctic sea floor for engineering purposes. [1982, 141p.] SR 83-25 Subsea permaftost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] Seismic velocities and subsea permaftost in the Beaufort Sea, Alaska. Neave, K.G., et al., [1983, p.894-898] MP 1665 Determining distribution patterns of ice-bonded permaftost in the U.S. Beaufort Sea from seismic data. Neave, K.G., et al., [1984, p.275-25] MP 1893 Subsea permaftost distribution on the Alaskan sheif. Sellmann, P.V., et al., [1984, p.75-82] MP 1891 Seismic surveys of shallow subsea permaftost. Neave, K.G., et al., [1985, p.61-65] MP 1918 Seismic surveys of shallow subsea permaftost. Neave, K.G., et al., [1985, p.61-65] MP 1954 Galvanic methods for mapping resistive seabed features. Sellmann, P.V., et al., [1985, p.91-92] MP 1955 Freeze thaw consolidation of sediments, Beaufort Sea, Alaska. Lee, H.J., et al., [1985, 83p.] MP 2025 Subsidiance Slumping failure of an Alaskan earth dam. Collins, C.M., et al., [1977, 21p.) MR 1975, p.16-23]	urements. Blaisdell, G.L., [1982, 11p.] MP 1515 Heat fluxes, humidity profiles, and surface humidity. Andreas, B.L., [1982, 18p.] CR 82-12 Freezing of soil with surface convection. Lunardini, V.J., [1982, p.205-212] MP 1595 CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] Implications of surface energy in ice adhesion. Itagaki, K., [1983, p.41-48] Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1672 Climatic factors in cold regions surface conditions. Bilello, M.A., [1985, p.508-517] MP 1961 Field tests of the kinetic friction coefficient of sea ice. Tatinclaru, J.C., et al., [1985, 20p.] CR 85-17 Surface roughness Remote sensing program required for the AIDJEX model. Weeks, W.F., et al., [1974, p.22-44] MP 1040 Thickness and roughness variations of arctic multiyear sea ice. Ackley, S.F., et al., [1976, 25p.] Sea ice roughness and floe geometry over continental shelf. Tucker, W.B., et al., [1979, p.485-4897] MP 1163 Sea ice ridging over the Alaskan continental shelf. Tucker, W.B., et al., [1979, p.485-4897] MP 1240 Measurement of the shear stress on the underside of simulated ice covers. Calkins, D.J., et al., [1981, p.94-111] MP 1397 Asymmetric flows: application to flow below ice jama. Orgus, M., et al., [1981, p.94-111] MP 1397 Asymmetric flows: application to flow below ice jama. MP 1733 Modeling pressure ridge buildup on the geophysical scale.	Preezing of soil with phase change occurring over a finite temperature zone. Lunardini, V.J., [1985, p.38-45] MP 1884 Temperature effects Effect of temperature on the strength of frozen silt. Haynes, F.D., et al., [1977, 27p.] Abnormal internal friction peaks in single-crystal ice. Stallman, P.E., et al., [1977, 15p.] Ice accretion on ships. Itagaki, K., [1977, 22p.] Effect of temperature and strain rate on the strength of polycrystalline ice. Haynes, P.D., [1977, p.107-111] Temperature effects in compacting an asphalt concrete overlay. Eaton, R.A., et al., [1978, p.13-45-158] Thermal and load-associated distress in pavements. Johnson, T.C., et al., [1978, p.403-437] Effect of temperature on the strength of snow-ice. Haynes, P.D., [1978, 25p.] Laboratory experiments on icing of rotating blades. Ackley, S.F., et al., [1979, p.85-92] River ice. Asthon, G.D., [1979, p.38-45] Low temperature phase changes in moist, briny clays. Anderson, D.M., et al., [1980, p.139-144] Practure behavior of ice in Charpy impact testing. Itagaki, K., et al., [1980, 13p.] CR 8-13 Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance. Tice, A.R., et al., [1980, p.400-412] RMP 1412 Field cooling rates of asphalt concrete overlays at low temperatures. Eaton, R.A., et al., [1980, 11p.] CR 8-30 Hest transfer in cold climates. Lunardini, V.J., [1981].

		Toward in situ building R-value measurement. Flanders,
Aquatic plant growth in relation to temperature and unfrozen water content. Palazzo, A.I., et al., [1984, 8p.]	Terminology Sea ice conditions in the Arctic. Weeks, W.F., (1976,	S.N., et al, (1984, 13p.) CR 84-81
CR 84-14	p.173-205j Mar 910	Heating and cooling method for measuring thermal conduc- tivity. McGaw, R., [1984, 8p.] MP 1891
Temperature gradients Subsea permafrost study in the Beaufort Sea, Alaska. Sell-	Terrain identification Arctic and subarctic environmental analysis through BRTS-	Status of numerical models for heat and mass transfer in frost- susceptible soils. Berg, R.L., [1984, p.67-71]
mann, P.V., et al. (1979, p.207-213) MAP 1591	1 imagery. Anderson, D.M., et al, [1972, p.28-30] MP 1119	MP 1851
Arctic Ocean temperature, salinity and density, March-May 1979. McPhee, M.G., [1981, 20p.] SR 81-65	Computer modeling of terrain modifications in the arctic and	Theory of natural convection in snow. Powers, D., et al. [1985, p.10,641-10,649] MP 1957
Using sea ice to measure vertical heat flux in the ocean. McPhee, M.G., et al, (1982, p.2071-2074) MP 1521	subarctic. Outcalt, S.I., et al., [1977, p.24-32] MP 971	In-citu thermoconductivity measurements. Faucher, M.,
Preezing of semi-infinite medium with initial temperature	Hydrologic modeling from Landsat land cover data. McKim, H.L., et al, (1984, 19p.) SR 84-01	Heat transfer characteristics of thermosyphons with inclined
gradient. Lunardini, V.J., [1983, p.649-652] MP 1583	Tests	evaporator sections. Haynes, F.D., et al, [1986, p.285- 292] MP 2834
Theory of metamorphism of dry snow. Colbeck, S.C., [1983, p.5475-5482] MP 1603	Thermal scanning systems for detecting building heat loss. Grot, R.A., et al, [1978, p.B71-B90] MP 1212	Thermal diffusion Computer simulation of the snowmelt and soil thermal regime
Preezing of a semi-infinite medium with initial temperature	Frost susceptibility of soil; review of index tests. Chamber- lain, E.J., [1982, 110p.] MP 1557	at Barrow, Alaska. Outcalt, S.L., et al, [1975, p.709-715]
gradient. Lunardini, V.J., (1984, p.103-106) MP 1740	Thew consolidation	Infrared thermography of buildings. Munis, R.H., et al,
Vegetation and environmental gradients of the Prudhoe Bay region, Alaska. Walker, D.A., (1985, 239p.)	Overconsolidated sediments in the Beaufort Sea. Chamber- lain, E.J., [1978, p.24-29] MP 1255	[1977, 17p.] SR 77-29 Suppression of river ice by thermal effluents. Ashton, G.D.,
CR 85-14	Thew depth	(1979, 23p. ₁ CR 79-30
Temperature measurement Improved millivolt-temperature conversion tables for copper	Approach roads, Greenland 1955 program. [1959, 100p.] MP 1522	Neumann solution applied to soil systems. Lunardini, V.J., [1980, 7p.] CR 80-22
constantan thermocouples. 32F reference temperature. Stallman, P.E., et al, [1976, 66p.] SR 76-18	Prediction and validation of temperature in tundra soils. Brown, J., et al, [1971, p.193-197] MP 907	Thermal diffusivity of frozen soil. Haynes, F.D., et al.
1977 CREEL-USGS permafront program Beaufort Sea, Alas-	Light-colored surfaces reduce thaw penetration in permafrost.	Cylindrical phase change approximation with effective ther-
ka, operational report. Sellmann, P.V., et al., [1977, 19p.] SR 77-41	1977 tundra fire in the Kokolik River area of Alaska. Hall,	mal diffusivity. Lunardini, V.J., [1981, p.147-154] MP 1438
Thermal properties and regime of wet tundra soils at Barrow, Alaska. McGaw, R., et al, [1978, p.47-53]	D.K., et al., [1978, p.54-58] MP 1125 1977 tundra fire at Kokolik River, Alaska. Hall, D.K., et al.	Thermal drills
MP 1096	[1978, 11p.] SR 78-10	General considerations for drill system design. Mellor, M., et al, [1976, p.77-111] MP 256
Thermal scanning systems for detecting building heat loss. Grot, R.A., et al, [1978, p.B71-B90] MP 1212	Haul Road performance and associated investigations in Alaska. Berg, R.L., [1980, p.53-100] MP 1351	1979 Greenland Ice Sheet Program. Phase 1: casing opera- tion. Rand, J.H., [1980, 18p.] SR 88-24
Permafrost beneath the Beaufort Sea. Sellmann, P.V., et al. (1978, p.50-74) MP 1206	Crude oil spills on subarctic permafrost in interior Alaska.	Thermal effects
Drifting buoy measurements on Weddell Sea pack ice. Ack-	Long-term active layer effects of crude oil spilled in interior	Thermal energy and the environment. Crosby, R.L., et al., [1975, 3p. + 2p. figs.] MP 1480
Distribution and properties of subsea permafrost of the Beau-	Alaska. Collins, C.M., [1983, p.175-179] MP 1656 Comparison of two-dimensional domain and boundary inte-	Mechanics of cutting and boring in permafrost. [1981, 38p.] Mellor, M., CR 81-26
fort Sea. Sellmann, P.V., et al, [1979, p.93-115] MP 1287	gral geothermal models with embankment freeze-thaw field	Thermal expansion
Thermal observations of Mt. St. Helens before and during	data. Hromadka, T.V., II, et al, [1983, p.509-513] MP 1659	Movement of coastal sea ice near Prudhoe Bay. Weeks, W.F., et al., 1977, p.533-5461 MP 1066
eruption. St. Lawrence, W.F., et al, [1980, p.1526-1527] MP 1482	Recovery and active layer changes following a tundra fire in northwestern Alaska. Johnson, L., et al., [1983, p.543-	Nearshore ice motion near Prudhoe Bay, Alaska. Tucker,
Free water measurements of a snowpack. Fisk, D.J., [1983, p.173-176] MP 1758	547 ₁ MIP 1660	Thermal expansion of saline ice. Cox. G.F.N., (1983,
Thermal emittance of diathermanous materials. Munis,	They weakening Mobility of water in frozen soils. Lunardini, V.J., et al.	p.425-432j MP 1768 Thermal insulation
R.H., et al, [1984, p.209-220] MP 1863 Temperature variations	[1982, c15p.] MP 2012 Prost heave of full-depth asphalt concrete pavements. Zom-	Thermoinsulating media within embankments on perennially
Apparent anomaly in freezing of ordinary water. Swinzow,	erman, I., et al, [1985, p.66-76] MP 1927	Influence of insulation upon frost penetration beneath pave-
Tensile properties	Theories Interpretation of the tensile strength of ice under triaxial	ments. Eaton, R.A., et al, [1976, 41p.] SE 76-66 Road construction and maintenance problems in central Alas-
Reflect of temperature on the strength of snow-ice. Haynes, F.D., [1978, 25p.] CR 78-27	stresses. Nevel, D.E., et al, [1976, 9p.] CR 76-05 Small communities result in greater satisfaction. Ledbetter,	ka. Clark, E.F., et al, [1976, 36p.] SR 76-58
Temperature effect on the uniaxial strength of ice. Haynes,	C.B., (1977, 15p.) SR 77-36	Observation and analysis of protected membrane roofing sys- tems. Schaefer, D., et al, [1977, 40p.] CR 77-11
Asphalt concrete for cold regions. Dempsey, B.J., et al,	In-plane deformation of non-coaxial plastic soil. Takagi, S., [1978, 28p.]	Reinsulating old wood frame buildings with urea-formaldehyde foam. Tobiasson, W., et al, [1977, p.478-487]
[1980, 55p.] CR 89-95 Ice thickness-tensile stress relationship for load-bearing ice.	Evaluation of the moving boundary theory. Nakano, Y.,	MP 958
Johnson, P.R., (1980, 11p.) SR 80-09	Steady in-plane deformation of noncoaxial plastic soil.	Mid-winter installation of protected membrane roofs in Alas- ka. Asmot, H.W.C., [1977, 5p.] CR 77-21
Review of techniques for measuring soil moisture in situ. McKim, H.L., et al, [1980, 17p.] SR 80-31	Takagi, S., [1979, p.1049-1072] MP 1248 Thormal analysis	Maintaining buildings in the Arctic. Tobiasson, W., et al. [1977, p.244-251] MP 1568
Laboratory and field use of soil tensiometers above and below 0 deg C. Ingersoil, J., [1981, 17p.] SR 81-07	Applications of thermal analysis to cold regions. Sterrett, K.F., 1976, p.167-181; MP 890	Effects of moisture and freeze-thaw on rigid thermal insula- tions. Kaplar, C.W., 1978, p.403-417; MP 1055
Measuring mechanical properties of ice. Schwarz, J., et al,	Infrared thermography of buildings: an annotated bibliogra-	Cold climate utilities delivery design manual. Smith, D.W.,
[1981, p.245-254] MP 1556 Study on the tensile strength of ice as a function of grain size.	phy. Marshall, S.J., [1977, 21p.] SR 77-09 Infrared thermography of buildings. Munis, R.H., et al.	et al, [1979, c300 leaves] MP 1373 Sulfur foam as insulation for expedient roads. Smith, N., et
Currier, J.H., et al, [1983, 38p.] CR 83-14 Strain measurements on dumbbell specimens. Mellor, M.,	r1977, 21p.; SR 77-26	al, [1979, 21p.] CR 79-18 Moisture gain and its thermal consequence for common roof
[1983, p.75-77] MP 1683	Hydrologic aspects of ice jams. Calkins, D.J., (1986, p.603-609)	insulations. Tobiasson, W., et al. [1980, p.4-16]
Mechanical properties of multi-year sea ice. Testing tech- niques. Mellor, M., et al, [1984, 39p.] CR 84-08	Thermal conductivity Formation of ice ripples on the underside of river ice covers.	Losses from the Fort Wainwright heat distribution system.
Tensile strength of multi-year pressure ridge sea ice samples.	Ashton, G.D., [1971, 157p.] MIP 1243	Phetteplace, G., et al, [1981, 29p.] SR 81-14 Venting of built-up roofing systems. Tobiasson, W., [1981,
Mechanical properties of multi-year pressure ridge samples.	ty. Farouki, O., (1972, 90p.) CR 82-06	p.16-21 ₁ MLP 1496
Richter-Menge, J.A., [1985, p.244-251] MP 1936 Strain rate effect on the tensile strength of frozen silt. Zhu,		Roof moisture surveys. Tobiasson, W., et al, [1981, 18p.]
Y., et al, (1985, p.153-157) MP 1898	Frost action in New Jersey highways. Berg, R.L., et al,	Moisture detection in roofs with cellular plastic insulation. Korhonen, C., et al, [1982, 22p.] SR 82-67
Resistance of elastic rock to the propagation of tensile cracks. Peck, L., et al, [1985, p.7827-7836] MP 2052	Thermal properties and regime of wet tundra soils at Barrow,	Potential icing of the space shuttle external tank. Ferrick,
Tensile strength of multi-year pressure ridge sea ice samples. Cox, G.F.N., et al, (1985, p.375-380) MP 1906	Alaska, McGaw, R., et al., 1978, p.47-53	M.G., et al, [1982, 305p.] CR 82-25 Least life-cycle costs for insulation in Alaska. Flanders,
Tensile strength of frozen silt. Zhu, Y., , [1986, p.15-28] MP 1971	Roof response to icing conditions. Lane, J.W., et al., [1979,	S.N., et al, (1982, 47p.) CR \$2-27 Window performance in extreme cold. Flanders, S.N., et al,
Tennile strength	Time constraints on measuring building R-values. Flanders,	r1982, 21p. ₁ CR 82-38
Investigation of ice forces on vertical structures. Hirayama		Infrared inspection of new roofs. Korhonen, C., [1982, 14p.] SR 82-33
Interpretation of the tensile strength of ice under triaxia		Thawing beneath insulated structures on permafrost. Lunar- dini, V.J., [1983, p.750-755] MP 1662
stress. Nevel, D.E., et al, [1976, p.375-387] MP 990	Neumann solution applied to soil systems. Lunardini, V.J.,	Can wet roof insulation be dried out. Tobiasson, W., et al,
Interpretation of the tensile strength of ice under triaxis stresses. Nevel, D.E., et al, (1976, 9p.) CR 76-95	[[1980, 7p.] Cir #U-33	Toward in-situ building R-value measurement. Flanders,
Effect of temperature on the strength of frozen silt. Haynes	. [1980, 30p.] SR #0-38	
F.D., et al, [1977, 27p.] CR 77-03 Tenalle stress	[1981, 14p.] CR 81-25	Tobiasson, W., et al, [1984, 9p. + figs.] Mar 2011
Depth of water-filled crevasses of glaciers. Weertman, J.	Initial stage of the formation of soil-laden ice lenses. Takagi,	Measuring thermal performance of building envelopes: nine case studies. Planders, S.N., [1985, 36p.] CR 85-67
Plexural strength of ice on temperate lakes. Gow, A.J.	Computer models for two-dimensional steady-state heat con-	Deteriorated building panels at Sondrestrom, Greenland.
[1977, p.247-256] MP 106 Concentrated loads on a floating ice sheet. Nevel, D.R.	Solution of phase change problems. O'Neill, K., (1983,	Heat flow sensors on walls—what can we learn. Flanders,
(1977, p.237-245) MP 106		S.N., {1985, p.140-149} MLP 2002

Thermal institute (cont.)	Application of a numerical sea ice model to the East Greenland area. Tucker, W.B., 1982, 40p.; CR 82-16	Ecological impact of vehicle traffic on tundra. Abe'e, G., [1981, p.11-37] MI- 1463
Roof moisture surveys: yesterday, today and tomorrow. Tobiasson, W., et al, [1985, p.438-443 + figs.]	Physics of mathematical frost heave models: a review.	Long-term effects of off-road vehicle traffic on tundra terrain.
MP 2040	O'Neill, K., [1983, p.275-291] MP 1588	Abele, G., et al, [1984, p.283-294] MP 1820
Measured and expected R-values of 19 building envelopes. Planders, S.N., 1985, p.49-57, MP 2115	East Greenland Sea ice variability in large-scale model simulations. Walsh, J.E., et al, [1984, p.9-14] MIP 1779	Traction Shallow snow performance of wheeled vehicles. Harrison,
Vapor drive maps of the U.S.A. Tobiasson, W., et al, [1986,	On the decay and retreat of the ice cover in the summer MIZ.	W.L., [1976, p.589-614] MP 1130
7p. + graphs; MP 2041 Thermal pollution	Maykut, G.A., [1984, p.15-22] MP 1780 Ice dynamics. Hibler, W.D., III, [1984, 52p.]	Snow measurements in relation to vehicle performance. Harrison, W.L., [1981, p.13-24] MIP 1473
Thermal energy and the environment. Crosby, R.L., et al,	M 84-03	Prediction methods for vehicle traction on snow. Harrison,
[1975, 3p. + 2p. figs.] MP 1480 Thermal pollution studies of Presch Creek Riston ARR	Thermodynamic model of creep at constant stress and con-	W.L., [1981, p.39-46] MP 1475
Thermal pollution studies of French Creek, Bielson AFB, Alsaks. McFadden, T., [1976, 5p.] CR 76-14	Thermodynamic model of creep at constant stress and con- stant strain rate. Fish, A.M., [1984, p.143-161] MP 1771	Vehicle tests and performance in snow. Berger, R.H., et al, [1981, p.51-67] MIP 1477
River ice. Ashton, G.D., [1979, p.38-45] MP 1178	Thermokarst	Workshop on snow traction mechanics, 1979. Harrison,
Suppression of river ice by thermal effluents. Ashton, G.D., [1979, 23p.] CR 79-30	Human-induced thermokarst at old drill sites in northern Alaska. Lawson, D.E., et al, [1978, p.16-23]	W.L., ed, [1981, 71p.] SR \$1-16
Thormal properties	MP 1254	Fleid investigations of vehicle traction in snow. Harrison, W.L., (1981, p.47-48) MP 1476
Observation and analysis of protected membrane roofing sys- tems. Schaefer. D., et al. r1977, 40p.; CR 77-11	Thermosyphons Performance of a thermosyphon with an inclined evaporator	Shallow snow test results. Harrison, W.L., [1981, p.69-71]
tems. Schaefer, D., et al, [1977, 40p.] CR 77-11 Thermal and creep properties for frozen ground construction.	and vertical condenser. Zarling, J.P., et al, [1984, p.64-	MP 1478 Application of energetics to vehicle trafficability problems.
Sanger, F.J., et al, [1978, p.95-117] MIP 1624	68 ₁ MP 1677 Thickness	Brown, R.L., [1981, p.25-38] MP 1474
Thermal and creep properties for frozen ground construction. Sanger, F.J., et al, [1979, p.311-337] MP 1227	Sea ice growth, drift, and decay. Hibler, W.D., III, [1980,	Shallow anow model for predicting vehicle performance. Harrison, W.L., [1981, 21p.] CR 81-20
Time constraints on measuring building R-values. Flanders,	p.141-209j MP 1298	CRREL instrumented vehicle for cold regions mobility meas-
S.N., [1980, 30p.] CR 80-15 Comparison of two-dimensional domain and boundary inte-	Thet Terrain analysis from space shuttle photographs of Tibet.	urements. Blaisdell, G.L., [1982, 11p.] MP 1515
gral goothermal models with embankment freeze-thaw field	Kreig, R.A., et al, [1986, p.400-409] MIP 2897	Measurement of snow surfaces and tire performance evalua- tion. Blaisdell, G.L., et al, [1982, 7p.] MP 1516
data. Hromadka, T.V., II, et al, 1983, p.509-5131 MP 1659	Tidal currents Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto,	Driving traction on ice with all-sesson and mud-and-snow
Emittance and interpretation of thermal images. Munis,	L.W., [1973, 11p.] MP 1523	radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27 Field demonstration of traction testing procedures. Blais-
R.H., et al, [1985, p.72-78] MP 1962 Thermal analysis of a shallow utilidor. Phetteplace, G., et al,	Baseline data on the oceanography of Cook Inlet, Alaska. Gatto, L.W., [1976, 84p.] CR 76-25	dell, G.L., [1985, p.176] MP 2046
(1986, 10p.) MP 2021	Gatto, L.W., [1976, 84p.] CR 76-25 Estuarine processes and intertidal habitats in Grays Harbor,	Vehicle for cold regions mobility measurements. Blaisdell,
Thornal radiation	Washington: a demonstration of remote sensing techniques.	G.L., [1985, p.9-20] MP 2044 Trafficability
Thermal emittance of diathermanous materials. Munis, R.H., et al, [1984, p.209-220] MP 1863	Gatto, L.W., [1978, 79p.] CR 78-18 Remote sensing of water circulation in Grays Harbor, Wash-	Instrument for determining snow properties related to traffi-
Emittance and interpretation of thermal images. Munis,	ington. Gatto, L.W., [1980, p.289-323] MP 1283	cability. Parrott, W.H., et al, [1972, p.193-204]
R.H., et al, (1985, p.72-78) MP 1962 Thermal regime	Time factor Numerical simulation of atmospheric ice accretion. Ackley,	Evaluation of an air cushion vehicle in Northern Alaska.
Environmental setting, Barrow, Alaska. Brown, J., [1970,	S.F., et al. [1979, p.44-52] MIP 1235	Abele, G., et al, [1976, 7p.] MIP 894
p.50-64 ₁ MP 945 Temperature and flow conditions during the formation of	Tires	Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933
river ice. Ashton, G.D., et al, [1970, 12p.]	Vehicle damage to tundra soil and vegetation. Walker, D.A., et al, [1977, 49p.] SR 77-17	Arctic transportation: operational and environmental evalua-
MP 1723 Winter thermal structure and ice conditions on Lake Cham-	Effects of low ground pressure vehicle traffic on tundra.	tion of an air cushion vehicle in northern Alaska. Abele, G., et al, [1977, p.176-182] MP 985
plain, Vermont. Bates, R.B., [1976, 22p.] CR 76-13	Abele, G., et al., [1978, 63p.] SR 78-16 CRREL instrumented vehicle for cold regions mobility meas-	Prediction methods for vehicle traction on snow. Harrison,
Winter thermal structure, ice conditions and climate of Lake	urements. Blaisdell, G.L., [1982, 11p.] MIP 1515	W.L., [1981, p.39-46] MIP 1475 Application of energetics to vehicle trafficability problems.
Champiain. Bates, R.E., [1980, 26p.] CR 88-02 Crude oil spills on subarctic permafrost in interior Alaska.	CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-03	Brown, R.L., [1981, p.25-38] MP 1474
Johnson, L.A., et al, [1980, 128p.] MP 1310	Driving traction on ice with all-season and mud-and-anow	Field investigations of vehicle traction in snow. Harrison,
Thermal observations of Mt. St. Helens before and during eruption. St. Lawrence, W.F., et al, [1980, p.1526-1527]	radial tires. Blaisdell, G.L., [1983, 22p.] CR 83-27	W.L., [1981, p.47-48] MP 1476 Workshop on snow traction mechanics, 1979. Harrison,
MP 1482	Radial tire demonstration. Liston, R.A., [1985, p.281-285] MP 2102	W.L., ed, [1981, 71p.] SR \$1-16
Embankment dams on permafrost in the USSR. Johnson, T.C., et al, [1980, 59p.] SR \$0-41	Performance based tire specification system for military	Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478
Measuring building R-values for large areas. Flanders, S.N.,	wheeled vehicles. Blaisdell, G.L., [1985, p.277-280] MP 2101	Mobility bibliography. Liston, N., comp, [1981, 313p.]
et al, [1981, p.137-138] MP 1388 Some approaches to modeling phase change in freezing soils.	ISTVS workshop on tire performance under winter condi-	SR \$1-29
Hromadka, T.V., II, et al, [1981, p.137-145]	tions, 1983. [1985, 177p.] SR 85-15 Need for snow tire characterization and evaluation. Yong,	Vechicle mobility and anowpack parameters. Berger, R.H., [1983, 26p.] CR 83-16
MP 1437 Theory of thermal control and prevention of ice in rivers and	R.N., et al, [1985, p.1-2] MP 2043	Evaluating trafficability. McKim, H.L., [1985, p.474-475]
lakes. Ashton, G.D., [1982, p.131-185] MIP 1554	Winter tire tests: 1980-81. Blaisdell, G.L., et al, [1985, p.135-151] MP 2045	MP 2023
Review of analytical methods for ground thermal regime cal- culations. Lunardini, V.J., [1985, p.204-257]	Field demonstration of traction testing procedures. Blais-	Modeling N transport and transformations in soils. Selim,
MP 1922	dell, G.L., [1985, p.176] MP 2046	H.M., et al, [1981, p.233-241] MIP 1440 Modeling nitrogen transport and transformations in soils: 2.
Thornal stresses	Topographic effects VLF airborne resistivity survey in Maine. Arcone, S.A.,	Validation. Iskandar, I.K., et al., [1981, p.303-312]
Thermal and load-associated distress in pavements. Johnson, T.C., et al., (1978, p.403-437) MP 1209	[1978, p.1399-1417] MP 1166	MP 1441 Transmission
Physical and thermal disturbance and protection of perma-	Topographic features Arctic environment and the Arctic surface effect vehicle.	Catalog of smoke/obscurant characterization instruments.
frost. Brown, J., et al, [1979, 42p.] SR 79-05 Thermistors	Sterrett, K.F., [1976, 28p.] CR 76-01	O'Brien, H.W., et al, [1984, p.77-82] MP 1865
USACRREL precise thermistor meter. Trachier, G.M., et	Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MP 933	Performance of microprocessor-controlled snow crystal repli- cator. Koh, G., [1984, p.107-111] MP 1866
al, [1985, 34p.] SR 85-26 In-aitu thermoconductivity measurements. Faucher, M.,	Topological properties of some trellis pattern channel net-	Transmission lines
[1986, p.13-14] MP 2137	works. Mock, S.J., [1976, 54p.] CR 76-46 River channel characteristics at selected ice jam sites in Ver-	Undersea pipelines and cables in polar waters. Mellor, M., [1978, 34p.] CR 78-22
Thermodynamic properties Thermodynamic deformation of wet snow. Colbeck, S.C.,	mont. Gatto, L.W., [1978, 52p.] CR 78-25	Transmissivity
[1976, 9p.] CR 76-44	Extraction of topography from side-looking satellite systems	Snow-Two/Smoke Week VI field experiment plan. Red- field, R.K., et al., r1984, 85p.; SR 84-19
Oxygen isotopes in the basal zone of Matanuska Glacier. Lawson, D.E., et al, [1978, p.673-685] MP 1177	—a case study with SPOT simulation data. Ungar, S.G., et al, [1983, p.535-550] MP 1695	field, R.K., et al, [1984, 85p.] SR 84-19 Explosive obscuration sub-test results at the SNOW-TWO
Documentation for a two-level dynamic thermodynamic sea	Ice-cored mounds at Sukakpak Mountain, Brooks Range.	field experiment. Ebersole, J.F., et al, [1984, p.347-354] MP 1872
ice model. Hibler, W.D., III, [1980, 35p.] SR 89-08 On modeling the Weddell Sea pack ice. Hibler, W.D., III,	Brown, J., et al, [1983, p.91-96] MP 1653 Geographic features and floods of the Ohio River. Edwardo,	Approach to snow propagation modeling. Koh, G., 1984,
et al, [1982, p.125-130] MP 1549	H.A., et al, [1984, p.265-281] MIP 2083	p.247-259 ₃ MP 1869
Thermodynamics	Spatial analysis in recreation resource management. Edwardo, H.A., et al, [1984, p.209-219] MP 2884	Snow Symposium, 4th, Hanover, NH, Vol.1. [1984, 433p.] SR 84-35
Analysis of water in the Martian regolith. Anderson, D.M., et al., 1979, p.33-38; MP 1409	Terrain analysis from space shuttle photographs of Tibet.	Transportation
Dynamic thermodynamic sea ice model. Hibler, W.D., III,	Kreig, R.A., et al, [1986, p.400-409] MP 2897 Towers	Arctic transportation: operational and environmental evalua- tion of an air cushion vehicle in northern Alaska. Abele,
(1979, p.815-846) MP 1247 Thermodynamics of snow metamorphism due to variations in	Communication tower icing in the New England region.	G., et al, [1977, p.176-182] MP 985
curvature. Colbeck, S.C., [1980, p.291-301]	Mulherin, N., et al. [1986, 7p.] MP 2109	Operation of the CRRBL prototype air transportable shelter. Flanders, S.N., [1980, 73p.] SR 88-10
MP 1368 Modeling a variable thickness sea ice cover. Hibler, W.D.,	Tracked vehicles Effects of hovercraft, wheeled and tracked vehicle traffic on	Cold regions testing of an air-transportable shelter. Flan-
III, [1980, p.1943-1973] MP 1424	tundra. Abele, G., [1976, p.186-215] MP 1123	ders, S.N., +1981, 20n., CR #1-16
Introduction to the basic thermodynamics of cold capillary systems. Colbeck, S.C., [1981, 9p.] SR 81-06	Effect of snow cover on obstacle performance of vehicles. Hanamoto, B., [1976, p.121-140] MIP 933	Mobility bibliography. Liston, N., comp, [1981, 313p.] SR 61-29
Preliminary results of ice modeling in the Best Greenland	Effects of low ground pressure vehicle traffic on tundra at	Trees (plants)
area. Tucker, W.B., et al, [1981, p.867-878] MIP 1458	Lonely, Alaska. Abele, G., et al, [1977, 32p.] SR 77-31	Upland forest and its soils and litters in interior Alaska. Troth, J.L., et al, 1976, p.33-441 MP 867
Application of a numerical sea ice model to the East Green-	Volumetric constitutive law for snow under strain. Brown,	Wastewater applications in forest ecosystems. McKim,
land area. Tucker, W.B., r1981, 109p.; MP 1535	R.L., (1979, 13p.) CR 79-20	H.L., et al. (1982, 22n.) CR #2-19

Trenching	Tundra soils	Turbidity
Some aspects of Soviet trenching machines. Mellor, M.,	Word model of the Barrow ecosystem. Brown, J., et al,	Correlation and quantification of airborne spectrometer data
[1980, 13p.] SR 88-07 Subsea trenching in the Arctic. Mellor, M., [1981, p.843-	[1970, p.41-43] MP 943 Synthesis and modeling of the Barrow, Alaska, ecosystem.	to turbidity measurements at Lake Powell, Utah. Merry, C.J., [1970, p.1309-1316] MIP 1271
882 ₁ MP 1464	Coulombe, H.N., et al, (1970, p.44-49) MP 944	Water quality measurements at Lake Powell, Utah. Merry,
Ice gouge hazard analysis. Lanan, G.A., et al, (1986, p.57-66) MP 2106	Environmental setting, Barrow, Alaska. Brown, J., 1970, p.50-641 MP 945	C.J., _(1977, 38p.) SR 77-28 Turbulent exchange
Triexial tests	Ecological effects of oil spills and seepages in cold-dominated	Carbon dioxide exchange in tundra vegetation. Coyne, P.I.,
Kinetic nature of the long term strength of frozen soils. Fish,	environments. McCown, B.H., et al, [1971, p.61-65] MP 905	et al, [1972, p.36-39] MP 1375 Turbulent heat flux from Arctic leads. Andreas, E.L., et al,
A.M., [1980, p.95-108] MP 1450 Trinstrutoleone	Prediction and validation of temperature in tundra soils.	[1979, p.57-91] MP 1340
Vapor pressure of TNT by gas chromatography. Leggett,	Brown, J., et al, [1971, p.193-197] MIP 907 Proceedings 1972 Tundra Biome symposium. [1972, 211p.]	Estimation of heat and mass fluxes over Arctic leads. Andreas, E.L., [1980, p.2057-2063] MIP 1410
D.C., [1977, p.83-90] MP 915	MP 1374	Condensate profiles over Arctic leads. Andreas, B.L., et al,
Abiotic overview of the Tundra Biome Program, 1971.	Micrometeorological investigations near the tundra surface. Kelley, J.J., [1973, p.109-126] MP 1006	[1981, p.437-460] MP 1479 Turbulent flow
Weiler, G., et al, (1971, p.173-181) MP 986 Ecological and environmental consequences of off-road traf-	Pedologic investigations in northern Alaska. Tedrow, J.C.F.,	Formation of ice ripples on the underside of river ice covers.
fic in northern regions. Brown, J., (1976, p.40-53)	(1973, p.93-108) MIP 1005	Ashton, G.D., [1971, 157p.] MP 1243
MP 1383 Geoecological mapping scheme for Alaskan coastal tundra.	Soil properties of the International Tundra Biome sites. Brown, J., et al, [1974, p.27-48] MP 1043	Baseline data on the oceanography of Cook Inlet, Alaska. Gatto, L.W., 1976, 84p.; CR 76-25
Everett, K.R., et al, [1978, p.359-365] MP 1098		Frazil ice formation in turbulent flow. Muller, A., et al.
1977 tundra fire at Kokolik River, Alaska. Hall, D.K., et al, (1978, 11p.) SR 78-10	Boological investigations of the tundra biome in the Prudhoe Bay Region, Alaska. Brown, J., ed. [1975, 215p.] MP 1053	[1978, p.219-234] MIP 1135 Turbulent heat transfer from a river to its ice cover. Haynes,
[1978, 11p.] SR 78-10 Human-induced thermokarst at old drill sites in northern	Selected climatic and soil thermal characteristics of the Prudhoe Bay region. Brown, J., et al, [1975, p.3-12]	F.D., et al, [1979, 5p.] CR 79-13
Alaska. Lawson, D.E., et al, [1978, p.16-23] MP 1254	MP 1054	Freezing in a pipe with turbulent flow. Albert, M.R., et al, [1983, p.102-112] MP 1893
Tundra lakes as a source of fresh water: Kipnuk, Alaska.	Thermal properties and regime of wet tundra soils at Barrow, Alaska. McGaw, R., et al, [1978, p.47-53]	U.S. Army CRREL
Bredthauer, S.R., et al., (1979, 16p.) SR 79-30	MP 1096	Role of research in developing surface protection measures for the Arctic Slope of Alsaka. Johnson, P.R., [1978,
Recovery of the Kokolik River tundra area, Alaska. Hall, D.K., et al, [1979, 15p.] MIP 1638	Geoecological mapping scheme for Alaskan coastal tundra. Everett, K.R., et al, [1978, p.359-365] MP 1098	p.202-205 ₁ MP 1668
Geobotanical atlas of the Prudhoe Bay region, Alaska.	Fate of crude and refined oils in North Slope soils. Sexstone,	Cold Regions Research and Engineering Laboratory. Freitag, D.R., [1978, p.4-6] MP 1251
Walker, D.A., et al, [1980, 69p.] CR 80-14 Remote sensing of revegetation of burned tundra, Kokolik	A., et al, [1978, p.339-347] MP 1186 Tundra terrain	Ultrasonic tests
River, Alaska. Hall, D.K., et al, [1980, p.263-272]	Morphology of the North Slope. Walker, H.J., (1973, p.49-	Acoustic emissions in the investigation of avalanches. St. Lawrence, W.F., (1977, p.VII/24-VII/33) MP 1630
MP 1391 Coastal tundra at Barrow. Brown, J., et al, (1980, p.1-29)	52 ₁ MP 1004	Ultrasonic measurements on deep ice cores from Antarctica.
MP 1356	Vehicle damage to tundra soil and vegetation. Walker, D.A., et al, [1977, 49p.] SR 77-17	Gow, A.J., et al, [1978, p.48-50] MIP 1202 Ultrasonic investigation on ice cores from Antarctics.
Arctic ecosystem: the coastal tundra at Barrow, Alaska. Brown, J., ed, [1980, 571p.] MIP 1355	Tundra vegetation	Kohnen, H., et al, [1979, 16p.] CR 79-10
Road dust along the Haul Road, Alaska. Everett, K.R.,	Word model of the Barrow ecosystem. Brown, J., et al, [1970, p.41-43] MP 943	Ultrasonic investigation on ice cores from Antarctica. Kohnen, H., et al, [1979, p.4865-4874] MP 1239
[1980, p.101-128] MP 1352 Effects of a tundra fire on soil and vegetation. Racine, C.,	Environmental setting, Barrow, Alaska. Brown, J., 1970,	Ultrasonic tests of Byrd Station ice cores. Gow, A.J., et al,
[1980, 21p.] Richard SR 80-37	p.50-64 ₁ MP 945 Synthesis and modeling of the Barrow, Alaska, ecosystem.	[1979, p.147-153] MP 1282 Acoustic emission response of snow. St. Lawrence, W.F.,
Summer air temperature and precipitation in northern Alaska.	Coulombe, H.N., et al, [1970, p.44-49] MP 944	(1980, p.209-216) MP 1366
Haugen, R.K., et al, [1980, p.403-412] MP 1439 Point Barrow, Alaska, USA. Brown, J., [1981, p.775-776]	Carbon dioxide dynamics on the Arctic tundra. Coyne, P.I., et al, (1971, p.48-52) MP 903	Ultraviolet radiation
MP 1434	Seasonal variations in plant nutrition in tundra soils.	Observations of the ultraviolet spectral reflectance of snow. O'Brien, H.W., [1977, 19p.] CR 77-27
Analysis of processes of primary production in tundra growth forms. Tieszen, L.L., et al., (1981, p.285-356)	McCown, B.H., et al, (1971, p.55-57) MP 904 Ecological effects of oil spills and seepages in cold-dominated	Underground facilities
MP 1433	environments. McCown, B.H., et al. 1971, p.61-65	Experimental scaling study of an annular flow ice-water heat sink. Stubstad, J.M., et al, (1977, 54p.) CR 77-15
Tundra and analogous soils. Everett, K.R., et al, 1981, p.139-179 MP 1405	MF 905 Proceedings 1972 Tundra Biome symposium. [1972, 211p.]	Design procedures for underground heat sink systems. Stub-
Stabilizing fire breaks in tundra vegetation. Patterson, W.A.,	MP 1374	stad, J.M., et al, [1979, 186p. in var. pagns.] SR 79-96
III, et al, [1981, p.188-189] MP 1804 Ecological impact of vehicle traffic on tundra. Abele, G.,	Carbon dioxide exchange in tundra vegetation. Coyne, P.I., et al, [1972, p.36-39] MP 1375	Heating enclosed wastewater treatment facilities with heat
[1981, p.11-37] MP 1463	Vegetative research in arctic Alaska. Johnson, P.L., et al.	pumps. Martel, C.J., et al, [1982, 20p.] MP 1976 Comparative field testing of buried utility locators. Bigl,
Tundra soils on the Arctic Slope of Alaska. Everett, K.R., et al., 1982, p.264-280; MP 1552	[1973, p.169-198] MP 1008	S.R., et al, [1984, 25p.] MIP 1977
Modifications of permafrost, East Oumalik, Alaska. Law-	Tundra environment at Barrow, Alaska. Bunnell, F.L., et al, [1975, p.73-124] MP 1050	Detection of buried utilities. Bigl, S.R., et al, [1984, 36p.] CR 84-31
son, D.E., [1982, 33p.] CR 82-36 Environmental mapping of the Arctic National Wildlife Ref-	Boological investigations of the tundra biome in the Prudhoe	Prevention of freezing of wastewater treatment facilities.
uge, Alaska. Walker, D.A., et al, (1982, 59p. + 2 maps)	Boological investigations of the tundra biome in the Prudhoe Bay Region, Alaska. Brown, J., ed, [1975, 215p.] MP 1053	Reed, S.C., et al, (1985, 49p.) SR 85-11 Underground pipelines
CR 82-37 Recovery and active layer changes following a tundra fire in	Effects of hovercraft, wheeled and tracked vehicle traffic on tundra. Abele, G., [1976, p.186-215] MP 1123	Phase change around insulated buried pipes: quasi-steady
northwestern Alaska. Johnson, L., et al, [1983, p.543-	Influence of grazing on Arctic tundra ecosystems. Batzli,	method. Lunardini, V.J., [1981, p.201-207] MP 1496
547 ₁ MP 1660 Vegetation in two adjacent tundra habitats, northern Alaska.	G.O., et al., [1976, p.153-160] MP 970	Transient analysis of heat transmission systems. Phetto-
Roach, D.A., [1983, p.359-364] MIP 2064	Energy balance and runoff from a subarctic snowpack. Price, A.G., et al, [1976, 29p.] CR 76-27	place, G., [1981, 53p.] CR 81-24 Heating enclosed wastewater treatment facilities with heat
U.S. tundra biome publication list. Brown, J., et al., 1983, 29p., SR 83-29	Vehicle damage to tundra soil and vegetation. Walker, D.A., et al., [1977, 49p.] SR 77-17	pumps. Martel, C.J., et al, [1982, 20p.] MP 1976
Sensitivity of vegetation and soil flora to seawater spills, Alas-	Effects of low ground pressure vehicle traffic on tundra at	Approximate phase change solutions for insulated buried cyl- inders. Lunardini, V.J., [1983, p.25-32] MP 1593
ka. Simmons, C.L., et al, [1983, 35p.] CR 83-24 Potential responses of permafrost to climatic warming.	Lonely, Alaska. Abele, G., et al, [1977, 32p.] SR 77-31	Computer models for two-dimensional steady-state heat con-
Goodwin, C.W., et al, [1984, p.92-105] MIP 1710	1977 tundra fire in the Kokolik River area of Alaska. Hall,	duction. Albert, M.R., et al, [1983, 90p.] CR 83-10 Mitigative and remedial measures for chilled pipelines in dis-
Long-term effects of off-road vehicle traffic on tundra terrain. Abele, G., et al, [1984, p.283-294] MP 1820	D.K., et al, [1978, p.54-58] MIP 1125 Chemical composition of haul road dust and vegetation. Is-	continuous permafrost. Sayles, F.H., [1984, p.61-62] MP 1974
Vegetation recovery in the Cape Thompson region, Alaska.	kandar, I.K., et al, [1978, p.110-111] MIP 1116	Radar investigations above the trans-Alaska pipeline near
Everett, K.R., et al, [1985, 75p.] CR 85-11 Vegetation and environmental gradients of the Prudhoe Bay	Climatic and dendroclimatic indices in the discontinuous per-	Fairbanks. Arcone, S.A., et al, [1984, 15p.]
region, Alaska. Walker, D.A., [1985, 239p.]	mafrost zone of the Central Alaskan Uplands. Haugen, R.K., et al, [1978, p.392-398] MP 1999	Simplified design procedures for heat transmission system
CR 85-14 Tundra biome	Thermal properties and regime of wet tundra soils at Barrow, Alaska. McGaw, R., et al, [1978, p.47-53]	piping. Phetteplace, G.E., (1985, p.451-456)
Tundra biome program. Brown, J., [1970, p.1278]	MP 1096	Underwater ice
MP 881	Ecological baseline on the Alaskan haul road. Brown, J., ed, [1978, 131p.] SR 78-13	Field investigations of a hanging ice dam. Beltaca, S., et al., [1982, p.475-488] MP 1533
Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 888	Plant recovery from Arctic oil spills. Walker, D.A., et al,	Unfrozen water content
Summary of the 1971 US Tundra Biome Program. Brown, J., 1972, p.306-3131 MP 995	[1978, p.242-259] MP 1184 Effects of low ground pressure vehicle traffic on tundra.	Ionic migration and wathering in frozen Antarctic soils. Ugolini, F.C., et al., 1973, p.461-470, MP 941
Case for comparison and standardization of carbon dioxide	Abele, G., et al, [1978, 63p.] SR 78-16	Depth of water-filled crevasses that are closely spaced. Rob-
reference gases. Kelley, J.J., et al, [1973, p.163-181] MP 964	Tundra recovery since 1949 near Fish Creek, Alaska. Lawson, D.E., et al, (1978, 81p.) CR 78-28	in, G. de Q., et al, [1974, p.543-544] MP 1038
Soil properties of the International Tundra Biome sites.	Tunneling (excevation)	Electrical resistivity profile of permafrost. Hoekstra, P., [1974, p.28-34] MP 1048
Brown, J., et al, (1974, p.27-48) MP 1043 Ecological investigations of the tundra biome in the Prudhoe	Kinematics of axial rotation machines. Mellor, M., [1976, 45p.] CR 76-16	Prediction of unfrozen water contents in frozen soils from
Bay Region, Alaska. Brown, J., ed, (1975, 215p.)	Tunnels	liquid determinations. Tice, A.R., et al, [1976, 9p.] CR 76-68
MP 1053	Some experiences with tunnel entrances in permafrost. Linell, K.A., et al, (1978, p.813-819) MP 1107	Applications of thermal analysis to cold regions. Sterrett, K.F., [1976, p.167-181] MP 890
Tundra environment at Barrow, Alaska. Bunnell, F.L., et al,	Field dielectric measurements of frozen silt using VHF pulses.	Calculating unfrozen water content of frozen soils. McGaw,
[1975, p.73-124] MP 1050	Arcone, S.A., et al. [1984, p.29-37] MIP 1774	R., et al, [1976, p.114-122] MP 899

Unfresen water content (cont.)	Climate of remote areas in north-central Alaska: 1975-1979	Alaska Konsi Mountains
Determination of unfrozen water in frozen soil by pulsed	summary. Haugen, R.K., [1982, 110p.] CR \$2-35	Periglacial landforms and processes, Kenai Mts., Alaska.
nuclear magnetic resonance. Tice, A.R., et al, [1978, p.149-155] MP 1097	Guidebook to permafrost and its features, northern Alaska. Brown, J., ed, (1983, 230p.) MP 1640	Bailey, P.K., [1985, 60p.] SR 85-03
NMR phase composition measurements on moist soils.	Relationships between estimated mean annual air and perma-	Recevery of the Kokolik River tundra area, Alaska. Hall,
Tice, A.R., et al. [1978, p.11-14] MP 1210	frost temperatures in North-Central Alaska. Haugen, R.K., et al, [1983, p.462-467] MP 1638	D.K., et al, [1979, 15p.] MP 1638
Frost heave in an instrumented soil column. Berg, R.L., et al, [1980, p.211-221] MP 1331	Long-term active layer effects of crude oil spilled in interior	-Alaska-Livengood Construction and performance of the Hess creek earth fill
Low temperature phase changes in moist, briny clays. And-	Alaska. Collins, C.M., [1983, p.175-179] MP 1656	dam, Livengood, Alaska. Simoni, O.W., [1973, p.23-34]
erson, D.M., et al, [1980, p.139-144] MP 1330	Science program for an imaging radar receiving station in Alaska. Weller, G., et al, [1983, 45p.] MP 1884	MP 459
Unfrozen water contents of submarine permafrost determined by nuclear magnetic resonance. Tice, A.R., et al, [1980,	Growth and flowering of tuesocks in northcentral Alaska.	—Alaska—Matanuska Glacier Subserial sediment flow of the Matanuska Glacier, Alaska.
p.400-412 ₁ MP 1412	Haugen, R.K., et al, [1984, p.10-11] MP 1950	Lawson, D.E., [1982, p.279-300] MP 1806
Some approaches to modeling phase change in freezing soils. Hromadka, T.V., II, et al, [1981, p.137-145]	Revegetation along pipeline rights-of-way in Alaska. Johnson, L., [1984, p.254-264] MP 2113	-Alaska-North Slope
MP 1437	Vegetation and environmental gradients of the Prudhoe Bay	Radar imagery of ice covered North Slope lakes. Weeks, W.F., et al., (1977, p.129-136) MIP 923
Snow calorimetric measurement at SNOW-ONE. Fisk, D., 1982, p.133-138; MP 1986	region, Alaska. Walker, D.A., [1985, 239p.]	Surface protection measures for the Arctic Slope, Alaska.
[1982, p.133-138] MP 1986 Relationship between the ice and unfrozen water phases in	-Alacka-Anchorage	Johnson, P.R., (1978, p.202-205) MIP 1519
frozen soil. Tice, A.R., et al, [1982, 8p.] CR 82-15	Alaska Good Friday earthquake of 1964. Swinzow, G.K.,	Role of research in developing surface protection measures for the Arctic Slope of Alaska. Johnson, P.R., [1978,
Comparison of unfrozen water contents measured by DSC	[1982, 26p.] CR 82-01	p.202-205 _] MIP 1068
and NMR. Oliphant, J.L., et al, [1982, p.115-121] MP 1594	—Alaska—Arctic National Wildlife Refuge Environmental mapping of the Arctic National Wildlife Ref-	Ground pressures exerted by underground explosions. Johnson, P.R., r1978, p.284-290; MP 1520
Relationship between ice and unfrozen water in frozen soils.	uge, Alaska. Walker, D.A., et al, [1982, 59p. + 2 maps]	son, P.R., (1978, p.284-290) MP 1520 Summer air temperature and precipitation in northern Alaska.
Tice, A.R., et al, [1983, p.37-46] MP 1632 Free water measurements of a snowpack. Fisk, D.J., [1983,	CR \$2-37	Haugen, R.K., et al, [1980, p.403-412] MP 1439
p.173-176 ₁ MP 1758	—Alaska—Atkasook Surface temperature data for Atkasook, Alaska summer 1975.	Ice-covered North Slope lakes observed by radar. Weeks, W.F., et al, [1981, 17p.] CR 81-19
Effect of loading on the unfrozen water content of silt. Oli-	Haugen, R.K., et al, [1976, 25p.] SR 76-01	Tundra soils on the Arctic Slope of Alaska. Everett, K.R.,
phant, J.L., et al, [1983, 17p.] SR 83-18 Ice-cored mounds at Sukakpak Mountain, Brooks Range.	—Aleska—Barrow	et al, [1982, p.264-280] MP 1552
Brown, J., et al. [1983, p.91-96] MP 1653	Synthesis and modeling of the Barrow, Alaska, ecosystem. Coulombe, H.N., et al, [1970, p.44-49] MP 944	-Alaska-Norton Sound
Investigation of transient processes in an advancing zone of	Word model of the Barrow ecosystem. Brown, J., et al,	Sea ice rubble formations off the NE Bering Sea and Norton Sound. Kovacs, A., [1981, p.1348-1363] MIP 1527
freezing. McGaw, R., et al, [1983, p.821-825] MP 1663	[1970, p.41-43] MP 943	—Alaska—Oumalik
Soil-water diffusivity of unsaturated frozen soils at subzero	Bibliography of the Barrow, Alaska, IBP ecosystem model. Brown, J., [1970, p.65-71] MP 946	Modifications of permafrost, East Oumalik, Alaska. Law- son, D.E., [1982, 33p.] CR \$2-36
temperatures. Nakano, Y., et al, [1983, p.889-893] MP 1664	Environmental setting, Barrow, Alaska. Brown, J., (1970,	son, D.E., [1982, 33p.] CR 82-36 —Alaska—Point Hope
Water migration due to a temperature gradient in frozen soil.	p.50-641 MP 945	Case study: fresh water supply for Point Hope, Alaska.
Oliphant, J.L., et al, (1983, p.951-956) MP 1666	Tundra environment at Barrow, Alaska. Bunnell, F.L., et al, [1975, p.73-124] MP 1050	McFadden, T., et al, [1979, p.1029-1040] MIP 1222
Frozen soil-water diffusivity under isothermal conditions. Nakano, Y., et al, [1983, 8p.] CR 83-22	Snowdrift control at ILS facilities in Alaska. Calkins, D.J.,	-Alaska-Prodhoe Bay Selected climatic and soil thermal characteristics of the
Modeling the resilient behavior of frozen soils using unfrozen	[1976, 41p.] MP 914 Arctic ecosystem: the coastal tundra at Barrow, Alaska.	Prudhoe Bay region. Brown, J., et al, [1975, p.3-12]
water content. Cole, D.M., [1984, p.823-834] MP 1715	Brown, J., ed, [1980, 571p.] MP 1355	MP 1054
Aquatic plant growth in relation to temperature and unfrozen	Point Barrow, Alaska, USA. Brown, J., [1981, p.775-776]	Ecological investigations of the tundra biome in the Prudhoe Bay Region, Alaska. Brown, J., ed. [1975, 215p.] MP 1053
water content. Palazzo, A.J., et al, [1984, 8p.]	MP 1434 —Alaska—Caribou Creek	
CR 84-14 Effects of salt on unfrozen water content in silt, Lanzhou,	Hydrology and climatology of a drainage basin near Fair-	Dynamics of near-shore ice. Weeks, W.F., et al, [1976, p.9-34] MP 1380
China. Tice, A.R., et al, [1984, 18p.] CR 84-16	banks, Alaska. Haugen, R.K., et al, [1982, 34p.] CR 82-26	Vehicle damage to tundra soil and vegetation. Walker, D.A.,
Effects of magnetic particles on the unfrozen water content in	-Alaska-Central Alaskan Uplands	et al, [1977, 49p.] SR 77-17
soils. Tice, A.R., et al, [1984, p.63-73] MP 1790 Phase equilibrium in frost heave of fine-grained soil. Naka-	Climatic and dendroclimatic indices in the discontinuous per-	Movement of coastal sea ice near Prudhoe Bay. Weeks, W.F., et al, [1977, p.533-546] MP 1066
no, Y., et al, [1985, p.50-68] MP 1896	mafrost zone of the Central Alaskan Uplands. Haugen,	Study of a grounded floeberg near Reindeer Island, Alaska.
Effects of soluble salts on the unfrozen water content in silt.	R.K., et al, [1978, p.392-398] MP 1099	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] MP 1751
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al, [1985, p.99-109] MP 1933	R.K., et al, [1978, p.392-398] MP 1099 AlaskaChena River Debris of the Chena River. McFadden, T., et al, [1976,	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alaskan road.
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. (1985, p.99-109) MP 1933 Soil-water potential and unfrozen water content and tempera- ture. Xu, X., et al. (1985, p.1-14) MP 1932	R.K., et al, [1978, p.392-398] MP 1099 —Alaska—Chema River Debris of the Chena River. McFadden, T., et al, [1976, 14p.] CR 76-26	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., [1978, p.615-621] MP 1102 Determining subses permafrost characteristics with a cone
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., 1985, p.99-109, MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., 1985, p.1-14, MP 1932 Unfrozen water content in frozen ground. Xu, X., et al.,	R.K., et al, [1978, p.392-398] MP 1099 AlaskaChena River Debris of the Chena River. McFadden, T., et al, [1976,	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al,
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. (1985, p.99-109) MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. (1985, p.1-14) MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. (1985, p.83-87) MP 1959 Model for dielectric constants of frozen soils. Oliphant, J.L.,	R.K., et al, (1978, p.392-398) MP 1099 —Alaska—Chean River Debris of the Chena River. McFadden, T., et al, [1976, 14p.] CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al, [1977, 44p.] —Alaska—Cook Inlet	Study of a grounded floeberg near Reindeer Island, Alaska. Kovaca, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.B., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region, Alaska.
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. [1985, p.83-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] MP 1926	R.K., et al, [1978, p.392-398] MP 1099 —Alaska—Chema River Debris of the Chena River. McFadden, T., et al, [1976, 14p.] CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al, [1977, 44p.] CR 77-14 —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto,	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] Permsfroat and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permsfrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 90-14
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. (1985, p.99-109) MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. (1985, p.1-14) MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. (1985, p.83-87) MP 1939 Model for dielectric constants of frozen soils. Oliphant, J.L.	R.K., et al, (1978, p.392-398) MP 1099 —Alaska—Chean River McFadden, T., et al, (1976, 14p.) CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al, (1977, 44p.) CR 77-14 —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) MP 1523 Circulation and sediment distribution in Cook Inlet, Alaska.	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovaca, A., [1977, 9p.] Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.83-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom	R.K., et al, (1978, p.392-398) MP 1099 —Alaska—Chean River Debris of the Chena River. McFadden, T., et al, (1976, 14p.) CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al, (1977, 44p.) CR 77-14 —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) MP 1523 Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1976, p.205-227) MP 895	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] Permsfrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 90-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] MP 1926 Prozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and	R.K., et al. (1978, p.392-398) MP 1099 —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., (1976, 14p.) CR 76-26 Ice breakup on the Chena River 1975 and 1976. CR 77-14 —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) MP 1523 Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1976, p.205-227) MP 895 —Alaska—Deadhorse	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovaca, A., [1977, 9p.] Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837 —Alsaka—Sukakpak Mountains
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.83-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom	R.K., et al, (1978, p.392-398) MP 1099 —Alaska—Chean River Debris of the Chena River. McFadden, T., et al, (1976, 14p.) CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al, (1977, 44p.) CR 77-14 —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) MP 1523 Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1976, p.205-227) MP 895	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] Permsfrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 90-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] MP 1926 Prozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al. [1976, 121p.] SR 76-16 United States	R.K., et al. (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Lee breakup on the Chena River 1975 and 1976. CR 76-26 Lee breakup on the Chena River 1975 and 1976. CR 77-14 —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. (2176, 41p.) UNITED STATES	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovaca, A., [1977, 9p.] Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837 —Alsaka—Sakakpak Mountains Ioe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alsaka—Sanitna River
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. [1985, p.83-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al. [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D.,	R.K., et al, (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al, [1976, 14p.] —CR 76-26 Lee breakup on the Chena River 1975 and 1976. McFadden, T., et al, [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] —Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhores Snowdrift control at ILS facilities in Alaska. —(1976, 41p.) UNITED STATES —ALASKA—DONNELLY DOME	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837 —Alaska—Sakakpak Mountains Ico-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1633 —Alaska—Sasitma River Mapping of the LANDSAT imagery of the Upper Susitna
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] MP 1926 Prozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al. [1976, 121p.] SR 76-16 United States	R.K., et al. (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Lee breakup on the Chena River 1975 and 1976. CR 76-26 Lee breakup on the Chena River 1975 and 1976. CR 77-14 —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. (2176, 41p.) UNITED STATES	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovaca, A., [1977, 9p.] Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837 —Alsaka—Sakakpak Mountains Ioe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alsaka—Sanitna River
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57] Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) —Alanka Tundra biome applies new look to ecological problems in	R.K., et al, (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al, [1976, 14p.] —CR 76-26 Lee breakup on the Chena River 1975 and 1976. McFadden, T., et al, [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] —Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorese Snowdrift control at ILS facilities in Alaska. Calkina, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al, [1969, 87p.] MP 1180 United States	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alaska—Sakakpak Mountains Loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alaska—Sakakpak Rountains River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] Winter surveys of the upper Susitna River, Alaska. Biello, M.A., [1980, 30p.] SR 80-94
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.83-87] MP 1926 MP 1928 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 380	R.K., et al. (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McPadden, T., et al., (1976, 14p.) Ice breakup on the Chena River 1975 and 1976. CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., (1977, 44p.) —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1976, p.205-227) —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkins, D.J., MP 914 UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., (1969, 87p.) United States —Alaska—Elelson AFB	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] Permsfrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] Determining subsea permsfrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 90-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837 —Alsaka—Sakakpak Mountains Ico-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alsaka—Sasaltan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] CR 80-84 Winter surveys of the upper Susitna River, Alsaka. Bilello, M.A., [1980, 30p.] —Alsaka—Taku Giscler
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57] Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) —Alanka Tundra biome applies new look to ecological problems in	R.K., et al, (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al, [1976, 14p.] —CR 76-26 Lee breakup on the Chena River 1975 and 1976. McFadden, T., et al, [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] —Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorese Snowdrift control at ILS facilities in Alaska. Calkina, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al, [1969, 87p.] MP 1180 United States	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alaska—Sakakpak Mountains Loe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alaska—Sakakpak Rountains River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] Winter surveys of the upper Susitna River, Alaska. Biello, M.A., [1980, 30p.] SR 80-94
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 880 Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313] Radiation and evaporation heat loss during ice fog conditions.	R.K., et al., [1978, p.392-398] —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Ice breakup on the Chena River 1975 and 1976. CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkina, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Fadramats	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 90-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837 —Alsaka—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alsaka—Sasaftan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] CR 90-94 Winter surveys of the upper Susitna River, Alsaka. Bilello, M.A., [1980, 30p.] —Alsaka—Taku Giscler Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1984, p.224-239] MP 1215 —Alsaka—Tansasa River
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al. [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., [1986, p.37-42] MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 1880 Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313] MP 995 Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1051	R.K., et al. (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Lebris of the Chena River. McFadden, T., et al., [1976, 14p.] Lebreakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] MP 1523 Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] MP 895 —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkins, D.J., MP 914 UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Eislaon AFB Thermal pollution studies of French Creek, Bielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Fafrbanks Biological restoration strategies in relation to nutrients at a	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alsaka—Sakakpak Mountains Ioe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.1-96] —Alsaka—Sakakpak Mountains Ioe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.1-96] —Alsaka—Sakakpak thoustains River. Gatto, L.W., et al, [1980, 41p.] —Winter surveys of the upper Susitna River, Alsaka. Biletlo, M.A., [1980, 30p.] —Alsaka—Taku Glacier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alsaka—Tamasa River Bank recession and channel changes of the Tanana River,
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1926 MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 880 Summary of the 1971 US Tundra Biome Program. Brown, J., (1972, p.306-313, MP 995 Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27, MP 1051 Land treatment of wastewater at a subarctic Alaskan location Sietten, R.S., et al., [1976, 21p.] MP 868	R.K., et al., [1978, p.392-398] MP 1099 —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Lee breakup on the Chena River 1975 and 1976. CR 76-26 Lee breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkina, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Feirbanks Biological restoration strategies in relation to nutrients at a subarcite site in Fairbanks, Alaska. Johnson, L.A., [1978, p.460-466) MP 1180	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837 —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alaska—Sasaktan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] CR 86-04 Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] —Alaska—Taka Glacier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alaska—Tamasan River Bank recession and channel changes of the Tanana River, Alaska. Gatto, L.W., et al, [1984, 98p.] Brosion analysis of the Tanana River, Alaska. Collins, C.M.,
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57] Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] Summary of the 1971 US Tundra Biome Program. Brown, J., (1972, p.306-313) NP 983 Radiation and evaporation heat loss during ice fog conditions. MP 995 Radiation and evaporation heat loss during ice fog conditions. MP 985 Haines-Fairbanks pipeline: design, construction and opera-	R.K., et al. (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Lebris of the Chena River. McFadden, T., et al., [1976, 14p.] Lebreakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] MP 1523 Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] MP 895 —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkins, D.J., MP 914 UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Eielson AFB Thermal pollution studies of French Creek, Bielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Fafrbanks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., [1978, p.460-466) Chena River Lakes Project revegetation study—three-year	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blottin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alsaka—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1984, p.91-96] —Alsaka—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alsaka—Sakakpak Mountains River. Gatto, L.W., et al, [1980, 41p.] —Riseka—Taka Giscler Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] —Alsaka—Takasa River Bank recession and channel changes of the Tanana River, Alsaka. Gatto, L.W., et al, [1984, 98p.] Erosion analysis of the Tanana River, Alsaka. Collins, C.M., [1984, 8p. + figs.] MP 1748
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] MP 1926 Prozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al. [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Undra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 380 Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313] Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1951 Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1976, 21p.] NP 868 Haines-Fairbanks pipeline: design, construction and operation. Garfield, D.E., et al., [1977, 20p.] SR 77-04 Land treatment of wastewater in subarctic Alaska. Sletten,	R.K., et al., [1978, p.392-398] —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Lee breakup on the Chena River 1975 and 1976. CR 76-26 Lee breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227.] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkina, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of Prench Creek, Eielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Patrbenks Biological restoration strategies in relation to nutrients at a subarcite site in Pairbanks, Alaska. Johnson, L.A., [1978, p.460-466] Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., [1981, 59p.] CR 81-18	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al., [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al., [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al., [1980, 69p.] Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al., [1984, p.115-135] —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1984, p.19-6] —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1985, p.19-96] —Alaska—Sakakpak Wewer Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al., [1980, 41p.] —Alaska—Taku Glacier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al., [1954, p.224-239] —Alaska—Tamana River Bank recession and channel changes of the Tanana River, Alaska. Gatto, L.W., et al., [1984, 98p.] Tanana River monitoring and research studies care Fairbanks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska. Neill, C.R., et al., [1984, 98p. + 5 ap-banks, Alaska.
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57] MP 1926 MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1970, p.9 Summary of the 1971 US Tundra Biome Program. Brown, J., (1972, p.306-313) MP 380 Summary of the 1971 US Tundra Biome Program. Brown, J., (1972, p.306-313) MP 995 Radiation and evaporation heat loss during ice fog conditions. MF 986 Haines-Fairbanks pipeline: design, construction and operation. Garfield, D.E., et al., [1977, 20p.] SR 77-04 Land treatment of wastewater in subarctic Alaska. Stetten, R.S., et al., [1977, p.33-547] SR 77-04 Land treatment of wastewater in subarctic Alaska. Stetten, R.S., et al., [1977, p.33-547] MP 1268	R.K., et al. (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., (1976, 14p.) Le breakup on the Chena River 1975 and 1976. CR 76-26 Le breakup on the Chena River 1975 and 1976. McFadden, T., et al., (1977, 44p.) —Alaska—Cook Halet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) MP 1523 Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1976, p.205-227) MP 895 —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkina, D.J., (1976, 41p.) UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., (1969, 87p.) MP 1180 United States —Alaska—Elalson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., (1976, 5p.) —Alaska—Fairbenks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., (1981, 59p.) CR 81-18 Heat loss from the central heat distribution system, Fort	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Bilouin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region. Alsaka. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alsaka—Sakakpak Mountains Ioe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1633 —Alsaka—Sasaitan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] Winter surveys of the upper Susitna River, Alsaka. Biello, M.A., [1980, 30p.] —Alsaka—Taku Glacies Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alsaka—Tasasa River Bank recession and channel changes of the Tanana River, Alsaka. Gatto, L.W., et al, [1984, 98p.] MP 1748 Brosion analysis of the Tanana River, Alsaka. Collina, C.M., [1984, 8p. + figs.] MP 1748 Tanana River monitoring and research studies near Fairbanana, Alaska. Neill, C.R., et al, [1984, 98p. + 5 appends.] SR 84-37
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al. [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al. [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al. [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., [1985, p.46-57] MP 1926 Prozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al. [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Undra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 380 Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313] Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1951 Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1976, 21p.] NP 868 Haines-Fairbanks pipeline: design, construction and operation. Garfield, D.E., et al., [1977, 20p.] SR 77-04 Land treatment of wastewater in subarctic Alaska. Sletten,	R.K., et al., [1978, p.392-398] —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Lee breakup on the Chena River 1975 and 1976. CR 76-26 Lee breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227.] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkina, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of Prench Creek, Eielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Patrbenks Biological restoration strategies in relation to nutrients at a subarcite site in Pairbanks, Alaska. Johnson, L.A., [1978, p.460-466] Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., [1981, 59p.] CR 81-18	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al., [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al., [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region. Alsaka. Walker, D.A., et al., [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al., [1984, p.115-135] —Alsaka—Sakakpak Mountains Ioe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al., [1983, p.91-96] MP 1653 —Alsaka—Sasaitan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al., [1980, 41p.] Winter surveys of the upper Susitna River, Alsaka. Biletlo, M.A., [1980, 30p.] —Alsaka—Taku Glacier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al., [1954, p.224-239] MP 1215 —Alsaka—Tasasa River Bank rocession and channel changes of the Tanana River, Alsaka. Gatto, L.W., et al., [1984, 98p.) MP 1747 Brosion analysis of the Tanana River, Alsaka. Collina, C.M., (1984, 8p. + figs.) MP 1748 Tanana River monitoring and research studies near Fairbanka, Alsaka. Neill, C.R., et al., [1984, 89p. + 5 gs.) SR 24-37 Chena Flood Control Project and the Tanana River near Pairbanka, Alsaka. Buska, J.S., et al., [1984, 1p. + figs.)
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1926 MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) Summary of the 1971 US Tundra Biome Program. Brown, J., (1972, p.306-313) MP 995 Radiation and evaporation heat loss during ice fog conditions. McPadden, T., (1975, p.18-27) MP 995 Haines-Fairbanks pipeline: design, construction and operation. Garfield, D.E., et al., (1977, 20p.) SR 77-04 Land treatment of wastewater at a subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] MP 1268 Maintaining buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) MP 1504 Mid-winter installation of protected membrane roofs in Alas-	R.K., et al. (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., (1976, 14p.) Le breakup on the Chena River 1975 and 1976. CR 76-26 T., et al., (1977, 44p.) —Alaska—Cook Halet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1976, p.205-227) —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkins, D.J., (1976, 41p.) UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., (1969, 87p.) MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., (1976, 5p.) —Alaska—Farbanks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., (1981, 59p.) CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., (1982, 20p.) MP 1980 Radar investigations above the trans-Alaska pipeline near	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alsaka—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alsaks—Sasaltan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] Winter surveys of the upper Susitna River, Alsaka. Biello, M.A., [1980, 30p.] —Alsaka—Taka Giscier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alsaka—Tamasan River Bank recession and channel changes of the Tanana River, Alsaka. Gatto, L.W., et al, [1984, 98p.] English, Alsaka. Neill, C.R., et al, [1984, 98p. + 5 appends.] SR 84-37 Chena Flood Control Project and the Tanana River more Fairbanka, Alsaka. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.83-87] MP 1926 MP 1928 MP 1926 MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 880 Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313] Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1976, 21p.] SR 77-04 Land treatment of wastewater at a subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] Minitaling buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] CR 77-21	R.K., et al. (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Lee breakup on the Chena River 1975 and 1976. CR 76-26 Lee breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227.] —Alaska—Deadhorne Snowdrift control at ILS facilities in Alaska. Calkina, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Reirbanks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., [1978, p.460-466) Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., [1981, 59p.] CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., [1982, 20p.] MP 1980	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837 —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.19-96] MP 1633 —Alaska—Sasaktan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] CR 86-94 Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] —Alaska—Taka Giscler Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alaska—Taka Giscler Bank recession and channel changes of the Tanana River, Alaska. Gollins, C.M., [1984, 8p. + figs.] Tanana River monitoring and research studies near Fairbanks, Alaska. Neill, C.R., et al, [1984, 98p. + 5 appends.] Changer of the Tanana River, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745 Bank recession of the Tanana River, Alaska. Gatto, L.W.,
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1926 MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) Summary of the 1971 US Tundra Biome Program. Brown, J., (1972, p.306-313) MP 995 Radiation and evaporation heat loss during ice fog conditions. McPadden, T., (1975, p.18-27) MP 995 Haines-Fairbanks pipeline: design, construction and operation. Garfield, D.E., et al., (1977, 20p.) SR 77-04 Land treatment of wastewater at a subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] MP 1268 Maintaining buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) MP 1504 Mid-winter installation of protected membrane roofs in Alas-	R.K., et al., [1978, p.392-398] —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Ice breakup on the Chena River 1975 and 1976. CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] —Alaska—Cook Halet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkins, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Fatrhamks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., [1978, p.460-466] Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al, [1981, 59p.] CR 21-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., [1982, 20p.] Radar investigations above the trans-Alaska pipeline near Fairbanks. Arcone, S.A., et al, [1984, 15p.] CR 24-27 —Alaska—Harrison Bay	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] CR 90-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alsaka—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alsaka—Sasitan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] CR 80-94 Winter surveys of the upper Susitna River, Alsaka. Bilello, M.A., [1980, 30p.] —Alsaka—Taka Giscier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1213 —Alsaka—Tamasa River Bank recession and channel changes of the Tanana River, Alsaka. Gatto, L.W., et al, [1984, 98p.] MP 1745 Branan River monitoring and research studies near Pairbanks, Alsaka. Neill, C.R., et al, [1984, 198, 198, 5] SR 84-37 Chena Flood Control Project and the Tanana River near Pairbanks, Alsaka. Buska, J.S., et al, [1984, 11p. + figs.] MP 1748 Bank recession of the Tanana River, Alsaka. Gatto, L.W., [1984, 59p.] MP 1745 Bank recession of the Tanana River, Alsaka. Gatto, L.W., [1984, 59p.] MP 1745 Bank recession, vegetation and permafrost, Tanana River near
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 880 Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313, MP 295 Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1051 Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1977, 21p.] SR 77-04 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] MP 868 Haines-Fairbanks pipeline: design, construction and operation. Garfield, D.E., et al., [1977, 20p.] SR 77-04 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] MP 1268 Minitaling buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) MP 1508 Mid-winter installation of protected membrane roofs in Alaska kanot, H.W.C., [1977, 5p.] CR 77-21 Large mobile drilling riss used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 297, SR 78-04 Specialized pipeline equipment. Hanamoto, B., [1978, Specialized pipeline equipment.	R.K., et al., [1978, p.392-398] Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Ice breakup on the Chena River 1975 and 1976. CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] CR 77-14 —Alaska—Cook Ialet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sodiment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkins, D.J., (1976, 41p.) UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.) MF 1180 United States —Alaska—Elesson AFB Thermal pollution studies of Prench Creek, Eielson AFB, Alaska. McFadden, T., (1976, 5p.) —Alaska—Berlensks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., [1981, 59p.) CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., (1982, 20p.) MP 1980 Radar investigations above the trans-Alaska pipeline near Fairbanks. Arcone, S.A., et al., [1984, 15p.] CR 84-27 —Alaska—Harrison Bay Subses permafrost in Harrison Bay, Alaska. Neave, K.G., et	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] Structure of first-year pressure ridge sails in the Prudhoe Bay region. Trucker, W.B., et al, [1984, p.115-135] MP 1837 —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alaska—Sasaktan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] CR 26-48 Winter surveys of the upper Susitna River, Alaska. Biletto, M.A., [1980, 30p.] —Alaska—Taku Giscler Geobotanical studies on the Taku Glacier anomaly. Heuse-et, C.J., et al, [1954, p.224-239] —Alaska—Taku Giscler Bank recession and channel changes of the Tanana River Park recession and channel changes of the Tanana River Panana River monitoring and research studies near Fairbanks, Alaska. Neill, C.R., et al, [1984, 98p. + 5 ap-pends.] Chena Flood Control Project and the Tanana River near Fairbanks, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745 Bank recession of the Tanana River, Alaska. Gatto, L.W., [1984, 59p.) SR 34-21
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57] MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 880 Summary of the 1971 US Tundra Biome Program. J., (1972, p.306-313] MP 995 Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1051 Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1977, p.31-547] MP 1051 Land treatment of wastewater in subarctic on and operation. Garfield, D.E., et al., [1977, 20p.] SR 77-04 Land treatment of wastewater in subarctic Alaskan location. Garfield, D.E., et al., [1977, 20p.] SR 77-04 Land treatment of wastewater in subarctic Alaskan. Sletten, R.S., et al., [1977, p.33-547] MP 1268 Mid-winter installation of protected membrane roofs in Alaska, Aamot, H.W.C., [1977, 5p.] CR 77-21 Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] SR 78-04 Specialized pipeline equipment. Hanamoto, B., [1978, 30p.]	R.K., et al., [1978, p.392-398] —Alaska—Chena River Debris of the Chena River. McPadden, T., et al., [1976, 14p.] Le breakup on the Chena River 1975 and 1976. CR 76-26 Le breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] —Alaska—Cook Halet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] MP 1523 Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] MP 895 —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkina, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Elalson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Fairbanks Biological restoration studies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., [1978, p.460-466] Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., [1981, 59p.] CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., [1982, 20p.] MP 1980 Radar investigations above the trans-Alaska pipeline near Fairbanks. Arcone, S.A., et al., [1984, 15p.] CR 84-27 —Alaska—Harrison Bay Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.] CR 82-24	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region. Alsaka. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alsaka—Sakakpak Mountains Ioe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alsaka—Sakakpak Mountains Ioe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alsaka—Sassitan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] Winter surveys of the upper Susitna River, Alsaka. Biello, M.A., [1980, 30p.] —Alsaka—Taku Glacier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alsaka—Tassas River Bank recession and channel changes of the Tanana River, Alsaka. Gatto, L.W., et al, [1984, 98p.) MP 1747 Brosion analysis of the Tanana River, Alsaka. Collina, C.M., (1984, 8p. + figs.) Tanana River monitoring and research studies near Fairbanka, Alsaka. Buska, J.S., et al, [1984, 19p. + figs.) MP 1748 Bank recession of the Tanana River, Alsaka. Gatto, L.W., (1984, 59p.) MP 1745 Bank recession of the Tanana River, Alsaka. Gatto, L.W., (1984, 59p.) SR 84-21 Frazil ice pebbles, Tanana River, Alsaka. Chacho, E.F., et
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933. Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932. Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1928. MP 1929. Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926. Prozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928. United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16. United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874.—Alasks Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 880. Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313] MP 383. Adiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1051. Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1977, p.533-547] MP 868. Haines-Fairbanks pipeline: design, construction and operation. Garfield, D.E., et al., [1977, 20p.] SR 77-04. Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] MP 868. Maintaining buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) MP 1051. Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] CR 77-21. Large mobile drilling ries used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] SR 78-04. Specialized pipeline equipment. Hanamoto, B., [1978, SR 78-04. Specialized pipeline. [1978, 1978, SR 78-04. Specialized pipeline.] Medicalized pipe	R.K., et al., [1978, p.392-398] Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Ice breakup on the Chena River 1975 and 1976. CR 76-26 Ice breakup on the Chena River 1975 and 1976. McFadden, T., et al., [1977, 44p.] CR 77-14 —Alaska—Cook Ialet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sodiment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227.] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkins, D.J., (1976, 41p.) UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MF 1180 United States —Alaska—Elesson AFB Thermal pollution studies of Prench Creek, Eielson AFB, Alaska. McFadden, T., (1976, 5p.) —Alaska—Beirbenks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., [1981, 59p.) CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., (1982, 20p.) MP 1980 Radar investigations above the trans-Alaska pipeline near Fairbanks. Arcone, S.A., et al., [1984, 15p.] CR 84-27 —Alaska—Harrison Bay Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., (1982, 62p.) —Alaska—Kachemak Bay Ice distribution and winter surface circulation, Kachemak	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.1-96] MP 1653 —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.1-96] MP 1653 —Alaska—Sakakpak Messer Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] CR 80-04 Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.; —Alaska—Taku Glacier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alaska—Tamana River Bank recession and channel changes of the Tanana River, Alaska. Gatto, L.W., et al, [1984, 98p.] MP 1748 Tanana River monitoring and research studies near Pairbanks, Alaska. Neill, C.R., et al, [1984, 98p. + 5g.] Tanana River monitoring and research studies near Pairbanks, Alaska. Buska, J.S., et al, [1984, 11p. + fig.] SR 24-37 Chena Flood Control Project and the Tanana River near Pairbanks, Alaska. Buska, J.S., et al, [1984, 11p. + fig.] SR 34-37 Chena Flood Control Project and the Tanana River near Pairbanks, Alaska. Buska, J.S., et al, [1984, 11p. + fig.] SR 24-37 Chena Flood Control Project and the Tanana River near Pairbanks. Gatto, L.W., [1984, 53p.] SR 24-37 Chena Flood Control Project and the Tanana River near Fairbanks. Gatto, L.W., [1984, 53p.] SR 24-37 Chena Flood Control Project and permafrost, Tanana River near Fairbanks. Gatto, L.W., [1984, 53p.] SR 24-37 Chena Flood Control Project and the Tana
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926 MP 1928 United Kingsom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) Summary of the 1971 US Tundra Biome Program. Brown, J., (1972, p.306-313) MP 995 Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1977, p.533-547] MP 1651 Land treatment of wastewater in subarctic Alaskan location. Garfield, D.E., et al., [1977, 20p.] SR 77-04 Land treatment of wastewater in subarctic Alaskan Sletten, R.S., et al., [1977, p.533-547] MP 1268 Maintaining buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) MP 1268 Mid-winter installation of protected membrane roofs in Alaska. Asmot, H.W.C., [1977, 5p.] CR 77-21 Large mobile drilling rigs used along the Alaska piceline. Sellmann, P.V., et al., [1978, 23p.] SR 78-04 Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Environmental stlas of Alaska. Hartman, C.W., et al., (1978, 95p.) Geoecological mapping scheme for Alaskan coastal tundra.	R.K., et al., [1978, p.392-398] —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Le breakup on the Chena River 1975 and 1976. CR 76-26 T., et al., [1977, 44p.] —Alaska—Cook Halet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkins, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Farbanks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., [1978, p.460-456] Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., [1981, 59p.] CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., [1982, 20p.) MP 1980 Radar investigations above the trans-Alaska pipeline near Fairbanks. Arcone, S.A., et al., [1984, 15p.] —Alaska—Harrison Bay Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.) —Alaska—Kachemak Bay Loe distribution and winter surface circulation, Kachemak Bay, Alaska. Gatto, L.W., [1981, p.995-1001]	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] MP 1217 Geobotanical atlas of the Prudhoe Bay region. Alsaka. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alsaka—Sakakpak Mountains Ioe-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alsaka—Sasaitan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] Winter surveys of the upper Susitna River, Alsaka. Bilello, M.A., [1980, 30p.] —Alsaka—Taku Glacies Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alsaka—Tasasa River Bank recession and channel changes of the Tanana River, Alsaka. Gatto, L.W., et al, [1984, 98p.] MP 1747 Brosion analysis of the Tanana River, Alsaka. Collina, C.M., (1984, 8p. + figs.) Tanana River monitoring and research studies near Fairbanka, Alsaka. Buska, J.S., et al, [1984, 11p. + figs.) MP 1745 Bank recession of the Tanana River, Alsaka. Gatto, L.W., (1984, 59p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka, Alsaka. Buska, J.S., et al, [1984, 11p. + figs.) MP 1745 Bank recession of the Tanana River, Alsaka. Gatto, L.W., (1984, 59p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka, Alsaka. Buska, J.S., et al, [1984, 11p. + figs.) MP 1745 Bank recession of the Tanana River, Alsaka. Gatto, L.W., (1984, 59p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka, Alsaka. Buska, J.S., et al, [1984, 11p. + figs.) MP 1745 Bank recession of the Tanana River, Alsaka. Gatto, L.W., (1984, 59p.) SR 84-37 Chena Flood Control Project and the Tan
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933. Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932. Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1928. MP 1929. Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926. Prozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928. United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16. United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874.—Alasks Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 880. Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313] MP 383. Adiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] MP 1051. Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1977, p.533-547] MP 868. Haines-Fairbanks pipeline: design, construction and operation. Garfield, D.E., et al., [1977, 20p.] SR 77-04. Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] MP 868. Maintaining buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) MP 1051. Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] CR 77-21. Large mobile drilling ries used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] SR 78-04. Specialized pipeline equipment. Hanamoto, B., [1978, SR 78-04. Specialized pipeline. [1978, 1978, SR 78-04. Specialized pipeline.] Medicalized pipe	R.K., et al. (1978, p.392-398] —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., (1976, 14p.) Le breakup on the Chena River 1975 and 1976. McFadden, T., et al., (1977, 44p.) —Alaska—Cook Halet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) MP 1523 Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1976, p.205-227) —MP 895 —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkina, D.J., (1976, 41p.) UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., (1969, 87p.) MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Elelson AFB, Alaska. McFadden, T., (1976, 5p.) —Alaska—Fatrhenks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., (1981, 59p.) CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., (1982, 20p.) MP 1980 Radar investigations above the trans-Alaska pipeline near Fairbanks. Arcone, S.A., et al., (1984, 15p.) CR 84-27 —Alaska—Harrison Bay Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., (1982, 62p.) CR 82-24 —Alaska—Eschemak Bay Loe distribution and winter surface circulation, Kachemak Bay, Alaska. Gatto, L.W., (1981, p.995-1001) MP 1442 Loe distribution and winter ocean circulation, Kachemak Bay, Alaska. Gatto, L.W., (1981, p.995-1001)	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alaska. Walker, D.A., et al, [1980, 69p.] Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] MP 1837 —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1633 —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alaska—Sakatna River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] —Alaska—Taka Glacier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alaska—Takasa River Bank recession and channel changes of the Tanana River, Alaska. Gatto, L.W., et al, [1984, 98p.] Tanana River monitoring and research studies near Fairbanka, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] Thena Flood Control Project and the Tanana River are Fairbanka, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745 Bank recession of the Tanana River, Alaska. Gatto, L.W., [1984, 59p.] SR 84-21 Parali ice pebbles, Tanana River, Alaska. Calko, E.F., et al, [1986, p.475-483] SR 94-21 Prazil ice pebbles, Tanana River, Alaska. Choh. E.F., et al, [1986, p.475-483] MP 2139 —Alaska—Yakoa River MP 2139 —Alaska—Yakoa River
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1926 MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926 MP 1926 MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874—Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., (1970, p.9) MP 880 Summary of the 1971 US Tundra Biome Program. Brown, J., (1972, p.306-313) MP 995 Radiation and evaporation heat loss during ice fog conditions. McPadden, T., (1975, p.18-27) MP 1851 Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., (1977, p.18-27) MP 868 Haines-Pairbanks pipeline: design, construction and operation. Garfield, D.E., et al., (1977, 20p.) SR 77-04 Land treatment of wastewater in subarctic Alaskan location. Garfield, D.E., et al., (1977, 20p.) SR 77-04 Land treatment of wastewater in subarctic Alaskan location. R.S., et al., (1977, p.533-547) MP 1268 Mid-winter installation of protected membrane roofs in Alaskan Aamot, H.W.C., (1977, 5p.) CR 77-21 Large mobile drilling rigs used along the Alaska pipeline. Selimann, P.V., et al., (1978, 23p.) SR 78-04 Specialized pipeline equipment. Hanamoto, B., (1978, 95p.) Environmental stlas of Alaska. Hartman, C.W., et al., (1978, 95p.) Geocological mapping scheme for Alaskan coastal tundra. Bverett, K.R., et al., (1978, p.399-365) MP 1998 Notes and quotes from snow and ice observers in Alaska. Bileillo, M.A., (1979, p.116-118)	R.K., et al., [1978, p.392-398] —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., [1976, 14p.] Le breakup on the Chena River 1975 and 1976. CR 76-26 T., et al., [1977, 44p.] —Alaska—Cook Halet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., [1973, 11p.] Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., [1976, p.205-227] —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkins, D.J., [1976, 41p.] UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., [1969, 87p.] MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., [1976, 5p.] —Alaska—Farbanks Biological restoration strategies in relation to nutrients at a subarctic site in Fairbanks, Alaska. Johnson, L.A., [1978, p.460-456] Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., [1981, 59p.] CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., [1982, 20p.) MP 1980 Radar investigations above the trans-Alaska pipeline near Fairbanks. Arcone, S.A., et al., [1984, 15p.] —Alaska—Harrison Bay Subsea permafrost in Harrison Bay, Alaska. Neave, K.G., et al., [1982, 62p.) —Alaska—Eachemak Bay Lee distribution and winter surface circulation, Kachemak Bay, Alaska. Gatto, L.W., [1981, 43p.] CR 81-22 Lee distribution and winter ocean circulation, Kachemak Bay, Alaska. Gatto, L.W., [1981, 43p.] CR 81-22	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.B., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region. Alaska. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alaska—Sasaltan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] —Alaska—Taka Giscler Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alaska—Tamasan River Bank recession and channel changes of the Tanana River, Alaska. Gatto, L.W., et al, [1984, 98p.] Tanana River monitoring and research studies near Fairbanka, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] Tanana River monitoring and research studies near Fairbanka, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745 Bank recession of the Tanana River, Alaska. Gatto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745 Bank recession of the Tanana River, Alaska. Gatto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka. Catto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka. Catto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka. Catto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River, Alaska. Chacho, E.F., et al, (1986, p.475-483) Sub-loe channels and frazil bars,
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1928 MP 1928 MP 1928 MP 1926 MP 1926 Frozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 880 Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313] Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1976, 21p.] SR 77-04 Land treatment of wastewater at a subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] Minitaning buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) Mid-winter installation of protected membrane roofs in Alaska. Aamot, H.W.C., [1977, 5p.] CR 77-21 Large mobile drilling rigs used along the Alaska pipeline. Sellmann, P.V., et al., [1978, 23p.] Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Brivronmental stlas of Alaska. Hartman, C.W., et al., (1978, 95p.) Geoecological mapping scheme for Alaskan coastal tundra. Byerett, K.R., et al., [1978, p.339-365] MP 1998 Notes and quotes from snow and ice observers in Alaska. Bilello, M.A., [1979, p.116-118] Brivronment of the Alaskan Haul Road. Brown, J., [1980, Brivronment of the Alaskan Haul Road. Brown, J., [1980, Brivronment of the Alaskan Haul Road. Brown, J., [1980, Brivronment of the Alaskan Haul Road. Brown, J., [1980, Brivronment of the Alaskan Haul Road. Brown, J., [1980, Brivronment of the Alaskan Haul Road. Brown, J., [1980, Brivronment of the A	R.K., et al., (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., (1976, 14p.) Le breakup on the Chena River 1975 and 1976. McFadden, T., et al., (1977, 44p.) —Alaska—Cook Inlet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1976, p.205-227) —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkina, D.J., (1976, 41p.) UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., (1969, 87p.) MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., (1976, 5p.) —Alaska—Feirbanks Biological restoration strategies in relation to nutrients at a subarcite site in Fairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., (1981, 59p.) CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., (1982, 20p.) MP 1980 Radar investigations above the trans-Alaska pipeline near Pairbanks. Arcone, S.A., et al., (1984, 15p.) CR 84-27 —Alaska—Harrison Bay Subsea permarrost in Harrison Bay, Alaska. Neave, K.G., et al., (1982, 62p.) —Alaska—Ecchemak Bay Ice distribution and winter surface circulation, Kachemak Bay, Alaska. Gatto, L.W., (1981, 43p.) MP 1442 Lee distribution and winter ocean circulation, Kachemak Bay, Alaska. Gatto, L.W., (1981, 43p.)	Study of a grounded floeberg near Reindeer Island, Alsaka. Kovacs, A., [1977, 9p.] Permafrost and active layer on a northern Alsakan road. Berg, R.L., et al, [1978, p.615-621] Determining subses permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alsaka. Blouin, S.E., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region, Alsaka. Walker, D.A., et al, [1980, 69p.] Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alsaks—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1633 —Alsaks—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alsaks—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] MP 1653 —Alsaks—Sakakpak Mountains River. Gatto, L.W., et al, [1980, 41p.) —Kasaka—Taku Glacier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] —Alsaka—Taka Glacier Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] —Alsaka—Tasassa River Bank recession and channel changes of the Tanana River, Alsaka. Gatto, L.W., et al, [1984, 98p.] Tanana River monitoring and research studies near Fairbanka, Alsaka. Neill, C.R., et al, [1984, 98p. + 5 appends.] Chena Flood Control Project and the Tanana River near Fairbanka, Alsaka. Buska, J.S., et al, [1984, 98p. + 5 appends.] Chena Flood Control Project and the Tanana River near Fairbanka, Alsaka. Buska, J.S., et al, [1984, 98p. + 5 appends.] Chena Flood Control Project and the Tanana River near Fairbanka. Gatto, L.W., [1984, 59p.] SR 84-21 Frazil ice pebbles, Tanana River, Alsaka. Chacho, B.F., et al, [1984, 949.] SR 94-21 Frazil ice pebbles, Tanana River, Alsaka. Chacho, B.F., et al, [1986, p.475-483] Sub-ice channels and frazil bars, Tanana River Rasakurer Berak-up dates for the Yukon River; Pt.1. Rampart to Whitehore,
Effects of soluble salts on the unfrozen water content in silt. Tice, A.R., et al., [1985, p.99-109] MP 1933 Soil-water potential and unfrozen water content and temperature. Xu, X., et al., [1985, p.1-14] MP 1932 Unfrozen water content in frozen ground. Xu, X., et al., [1985, p.3-87] MP 1928 Yes, p.83-87] MP 1929 Model for dielectric constants of frozen soils. Oliphant, J.L., (1985, p.46-57) MP 1926 Prozen ground physics. Fish, A.M., [1985, p.29-36] MP 1928 United Kingdom Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al., [1976, 121p.] SR 76-16 United States Snow and ice prevention in the United States. Minsk, L.D., (1986, p.37-42) MP 1874 —Alaska Tundra biome applies new look to ecological problems in Alaska. Brown, J., [1970, p.9] MP 880 Summary of the 1971 US Tundra Biome Program. Brown, J., [1972, p.306-313] Radiation and evaporation heat loss during ice fog conditions. McFadden, T., [1975, p.18-27] Land treatment of wastewater at a subarctic Alaskan location. Sletten, R.S., et al., [1976, 21p.] SR 77-04 Land treatment of wastewater at a subarctic Alaskan location. Graffield, D.E., et al., [1977, 20p.] SR 77-04 Land treatment of wastewater in subarctic Alaska. Sletten, R.S., et al., [1977, p.533-547] MP 1268 Minimaling buildings in the Arctic. Tobiasson, W., et al., (1977, p.244-251) Mid-winter installation of protected membrane roofs in Alaska. SR 78-04 Specialized pipeline equipment. Hanamoto, B., [1978, 30p.] Environmental stlas of Alaska. Hartman, C.W., et al., (1978, 95p.) Geoecological mapping scheme for Alaskan coastal tundra. Everett, K.R., et al., [1978, p.339-365] MP 1998 Notes and quotes from snow and ice observers in Alaska. Biello, M.A., [1979, p.116-118] Environment of the Alaskan Haul Road. Brown, J., [1980, 1980]	R.K., et al., (1978, p.392-398) —Alaska—Chena River Debris of the Chena River. McFadden, T., et al., (1976, 14p.) Le breakup on the Chena River 1975 and 1976. McFadden, T., et al., (1977, 44p.) —Alaska—Cook Italet Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto, L.W., (1973, 11p.) Circulation and sediment distribution in Cook Inlet, Alaska. Gatto, L.W., (1976, p.205-227) —Alaska—Deadhorse Snowdrift control at ILS facilities in Alaska. Calkina, D.J., (1976, 41p.) UNITED STATES —ALASKA—DONNELLY DOME Patterned ground in Alaska. Péwé, T.L., et al., (1969, 87p.) MP 1180 United States —Alaska—Elelson AFB Thermal pollution studies of French Creek, Eielson AFB, Alaska. McFadden, T., (1976, 5p.) —Alaska—Febreanks Biological restoration strategies in relation to nutrients at a subscretic site in Fairbanks, Alaska. Johnson, L.A., (1978, p.460-466) Chena River Lakes Project revegetation study—three-year summary. Johnson, L.A., et al., (1981, 59p.) CR 81-18 Heat loss from the central heat distribution system, Fort Wainwright. Phetteplace, G.E., (1982, 20p.) MP 1980 Radar investigations above the trans-Alaska pipeline near Pairbanks. Arcone, S.A., et al., (1984, 15p.) CR 84-27 —Alaska—Harrison Bay Subsea permafrost in Harrison Bay, Alaska. Neave, K.O., et al., (1982, 62p.) —Alaska—Kachemak Bay Ice distribution and winter ocean circulation, Kachemak Bay, Alaska. Gatto, L.W., (1981, 43p.) MP 1442 Ice distribution and winter ocean circulation, Kachemak Bay, Alaska. Gatto, L.W., (1981, 43p.)	Study of a grounded floeberg near Reindeer Island, Alaska. Kovacs, A., [1977, 9p.] MP 1751 Permafrost and active layer on a northern Alaskan road. Berg, R.L., et al, [1978, p.615-621] MP 1102 Determining subsea permafrost characteristics with a cone penetrometer—Prudhoe Bay, Alaska. Blouin, S.B., et al, [1979, p.3-16] Geobotanical atlas of the Prudhoe Bay region. Alaska. Walker, D.A., et al, [1980, 69p.] CR 80-14 Structure of first-year pressure ridge sails in the Prudhoe Bay region. Tucker, W.B., et al, [1984, p.115-135] —Alaska—Sakakpak Mountains Ice-cored mounds at Sukakpak Mountain, Brooks Range. Brown, J., et al, [1983, p.91-96] —Alaska—Sasaltan River Mapping of the LANDSAT imagery of the Upper Susitna River. Gatto, L.W., et al, [1980, 41p.] Winter surveys of the upper Susitna River, Alaska. Bilello, M.A., [1980, 30p.] —Alaska—Taka Giscler Geobotanical studies on the Taku Glacier anomaly. Heusser, C.J., et al, [1954, p.224-239] MP 1215 —Alaska—Tamasan River Bank recession and channel changes of the Tanana River, Alaska. Gatto, L.W., et al, [1984, 98p.] Tanana River monitoring and research studies near Fairbanka, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] Tanana River monitoring and research studies near Fairbanka, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745 Bank recession of the Tanana River, Alaska. Gatto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka, Alaska. Buska, J.S., et al, [1984, 11p. + figs.] MP 1745 Bank recession of the Tanana River, Alaska. Gatto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka. Catto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka. Catto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River near Fairbanka. Catto, L.W., (1984, 53p.) SR 84-37 Chena Flood Control Project and the Tanana River, Alaska. Chacho, E.F., et al, (1986, p.475-483) Sub-loe channels and frazil bars,

- Composed of waters and the control of the control	Break-up of the Yukon River at the Haul Road Bridge: 1979. Stephens, C.A., et al, [1979, 22p. + Figs.] MP 1315	Washington Quincy Land treatment of wastewater. Murrmann, R.P., et al,	Oil spills on permafrost. Collins, C.M., et al, [1976, 18p.] SR 76-15
Application of the engineering and ensemble to 100 real Lates problems. Proting D.A., 1971, 1911-195. MM PMS. 1911-195.	-California-Manteca	[1976, 36p.] MP 920	Computer modeling of terrain modifications in the arctic and
papelosane of the emplorating and emptode to Cross L. Mar. 1981. 1982. 1	[1976, 36p.] SCP 920	Land use and water quality relationships, eastern Wisconsin.	MP 971
Indees. Poling, D.A., (1974, p.131-13). Addison. Consistants, In. L., et al., (1984, p.151-13). Addison. Consistants, In. L., et al., (1984, p.151-13). Bases for the large on water configuration of the configuration of the large state of			
- Tables Street - Promoting solution to the jump content plants of the p	problems. Preitag. D.R., [1972, p.131-138]	Impact of dredging on water quality at Kewaunee Harbor,	
p. 23-23-33 cm for the first part of the properties of monor sensing in the flucture (1995, p. 13-25) common for monor sensing in the flucture (1995, p. 13-25) cm for the properties of the pro	—Idaho-Salmon River	CR 84-21	Second progress report on oil spilled on permafrost. McFad-
Encidence, J. et al. (1984, p.19-25-5) Oran confliction on the Other and Ethical News 197-1941. Oran L. W., (1981, p. 856-861) Oran confliction on the Other and Ethical News 197-1942. Oran L. W., (1981, p. 856-861) Oran confliction of the Other and Ethical Science, P. V., et al. (1978, P. 199-1942) et al. (1978, P	p.529-533 ₃ MP 1796	Applications of remote sensing in the Boston Urban Studies	Ecology on the Yukon-Prudhoe haul road. Brown, J., ed,
he conditions on the Olde and Ellicots rivers. [1717, 1945, 1845]. 187 1945 188 2015	Potential solution to ice jam flooding: Salmon River, Idaho. Earickson, J., et al, (1986, p.15-25) MP 2131	Program, Parts I and II. Merry, C.J., et al., [1977, 36p.] CR 77-13	1977 tundra fire at Kokolik River, Alaska. Hall, D.K., et al,
General Law, 1985, p. 856-861; Mr 1914 Application of an althorn resistivity growy conducted at very low frequency. Across, 5.4., 1977, 499, 1987 Bases, 2, 1983, 499; Br. 28-32 Br. 28-			
Bedood, package purvey in northern Malins. Scillaman, P.V. Chillers - Alleand. Alleand - Alleand. Alleand - Alleand. Alleand - Alleand. Alleand. Alleand. Alleand. Alleand. Alleand	Gatto, L.W., [1985, p.856-861] MP 1914	Post occupancy evaluation of a planned community in Arctic	[1978, p.305-323] MP 1185
Provingation of an informer realisativity survey conducted at the precipitation of an informer realisation, S. A., 1977, 198. **Born organ continuous organ at Alaganh, Malano, 1977, 190. **Adata——S. Adan Birse **Lee of Landard and for evoluting survey at the State of 1978, 1997, 1	Bedrock geology survey in northern Maine. Seilmann, P.V.,	Post occupancy evaluation for communities in hot or cold	Abele, G., et al, (1978, 34p.) SR 78-17
were for frequencing of Allagach, Man, 177-190. Bans, R. (1953, 69); - State—4, 696 and Strew continues growmard remote in the super State of the Profession for State Medical State of the	et al, {1976, 199.} CR 76-37 —Maine—Allegach		Merry, C.J., et al, [1979, p.197-198] MP 1510
Booker, E. (194), 495.) Makes—61, 49th River Line of Landau can be repetitiving accordant confidence of the Allacham Marketin, 1981, 245. All 1984—Allacem-descriptions are prepared to the State River Line of Landau can be repetitively accordant to the State River Line of Landau can be repetitively accordant to the State River Line of Landau can be repetitively accordant to the State River Line of Landau can be repetitively accordant to the State River Line of Landau can be repetitively accordant to the State River Line of Landau can be repetitively accordant to the State River Line of Landau can be repetitively accordant to the State River River of Landau can be repetitively accordant to the State River River of Landau can be repetitively accordant to the State River River of Landau can be repetitively accordant to the State River River of Landau can be repetitively accordant to the State River River of Landau can be repetitively accordant to the State River River of Landau can be repetitively accordant to the State River River of Landau can be repetitively accordant to the State River River of Landau Can be repetitively accordant to the State River River of Landau River River of Landau River region. Moreover, 1997 River of Landau River region of Landau River region. Moreover, 1997 River of Landau River	very low frequency. Arcone, S.A., [1977, 48p.]	Soil microbiology. Bosatta, B., et al., r. s. 1, p.38-44, MIP 1753	Sewage sludge for terrain stabilization, Part 2. Gaskin, D.A., et al, [1979, 36p.] SR 79-28
Boils, B. (1983, 693). Million - Gold, Seller Sell	CR 77-20	Properties of ures-doped ice in the CRREL test basin.	
Use of Landaus data for predicting sorowash turned in the upper Salat John Rever bank. March 201, of at 1978 1984 1984 1984 1984 1984 1984 1984 198	Bates, R., [1983, 49p.] SR 83-20	Crystalline structure of urea ice sheets used in modeling in the	Coastal tundra at Barrow. Brown, J., et al, [1980, p.1-29]
Messachest—Bessessing in the Botten Urben Studies Messachest	Use of Landsat data for predicting snowmelt runoff in the	CRREL test basin. Gow, A.J., [1984, p.241-253] MP 1835	Environment of the Alaskan Haul Road. Brown, J., [1980,
-Massachuseth-Baston Applications of process managing in the Rotton UPST 2002 Applications of recommendating in the Rotton UPST 2002 Applications of recommendation of the Rotton UPST 2002 Applications of recommendation of the Rotton UPST 2002 Applications of remote sensing in New England. McKing 1997, 1997. See 25th 199	upper Saint John River basin. Merry, C.J., et al, [1983, p.519-533] MP 1694	Crystalline structure of urea ice sheets. Gow, A.J., 1984, 480.1	
Program, Parts I and II. Merry, C.J., et al., (1977, 569). Michigan—Singular Bives Reprinciple modeling from Landant land cover data McKim, H.J., et al. (1994, 1992). SSR 84-01. Willifel holister caryoing in Lee qui Paris, Minnesota. Minneson — Economy, Minneson. SSR 84-01. Minneson.— Economy, Minneson. SSR 84-02. Minneson.— Economy, Minneson. SSR 84-03. Minneso	-Massachusetts-Besten	USSR	[1980, p.101-128] MIP 1352
-Michigan-Sughaw River [Figling Sugh and seasonal variations in non-cover density in the Figling Mar. [1946, 703] [Figling Mar. [1946, 703] [Figling Mar. [1947, 703] [Figling Mar	Program, Parts I and II. Merry, C.J., et al, [1977, 36p.]	US Army technical manual for design of foundations on	Johnson, L.A., et al, [1980, 67p.] CR 86-29
McRamester-Learning and Parks 1993 - Management for overland flow water. Palazzo, A.J., 1981, p.4-467, 1290; S.R. 1, 1981, p.4-467, p.4-468, p. 1290; S.R. 1, 1981, p.4-467, p. 1981, p.4-467, p. 1981, p.4-467, p. 1981, p	-Michigan-Seginew River	Regional and seasonal variations in snow-cover density in the	p.139-179j MP 1405
**Milith habiton supprise in Lac qui Parle, Minnesota. Mer. M. 2008. **Milith habiton supprise in Lac qui Parle, Minnesota. Mer. M. 2008. **Milith habiton supprise in Lac Qui Parle, Minnesota. Mer. M. 2008. **Milith habiton supprise in Lac Qui Parle, Minnesota. Mer. M. 2008. **Milith habiton. M. 2009. **Milith habito			irrigated with wastes. Palazzo, A.J., [1981, p.64-68]
Marsina—Economa, Lake Mortana MT, the 1957-1972 1958 25.11 Linnology of Lake Rocotsums, Mortana Storm, P.C. 1958, 1959-195 SR 8-3.11 Linnology of Lake Rocotsums, Mortana Storm, P.C. 1958, 1959-195 SR 8-3.11 Linnology of Lake Rocotsums River region. RE 83-31 Linnology of Lake Rocotsums River Rocotsum River region. Ref 83-31 Linnology of Lake Rocotsums River Rocotsum		S.R., [1984, 128p.] SR 84-36	MP 1425
Limnology of Lake Koocamus, Mr. the 1967-1972 undy. Bonde, T.H., et al. (1972, 1971-1972) Limnology of Lake Koocamus, Montana. Score, P.C. et al. Montana. McKim, H.L. et al. (1973, 1973-1974) Reviews and the Kootemal River region, Montana. Score and the Cootemal River region, Montana. McKim, H.L. et al. (1975, 5)-19. New Rangabate Applications of remote sensing in New Ragland. Association of visiter climatic data for three New Hampshire sites. Genous of visiter climatic data for three New Hampshire. Size 46-45 New Hampshire. History. New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the Cooteman River. New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the Cooteman River. New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the Cooteman River. New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the Cooteman River. New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the Cooteman River. New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the Cooteman River. New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the New Hampshire. Size 46-45 New Hampshire. Size 46-45 New Hampshire. Peer Pearl for the New Hampshire. Size 46-45 New Hampshire.	ry, C.J., et al, [1984, p.205-208] MP 2005	Scientists visit Kolyma Water Balance Station in the USSR.	MP 1434
Limotology of Lake Koccanus, Mortans. Storm. P.C., et al., [1982, 5973.] Mestern—Revisional River Barriconnessed analyses in the Koccana River region. Mortans. T.C., et al., [1996, 598). SR 78-13. New England Analyses in the Work of the County of the C	Limnology of Lake Koocanusa, MT, the 1967-1972 study.		tems. Palazzo, A.J., et al. (1982, p.135-154)
Applications of remote sensing in New England McKim, HL, et al., [1976, 53p.) SR 84-34 William of the Control of the Child State of the Chil			CO2 effect on permafrost terrain. Brown, J., et al, [1982,
Rovicomental analyses in the Kootenal River region, Montana McKim, H.L., et al., [1976, 53p.) arX feet and the first state of t		Embankment dams on permafrost in the USSR. Johnson,	
Now Baginson of remote sensing in New England. McKin, H.L., et al. (1975, 8p. + 1e figs. and tables) MP 913 New Baginshier climatic data for three New Hampshire Comparison of without climatic data for three New Hampshire. Bates, R.E., (1984, 78p.) SR 84-54 New Hampshire-Hamorer Climate at CRREI, Hamorer, New Hampshire. Bates, R.E., (1984, 78p.) New Baginshier Comparison of without climatic data for three New Hampshire. Bates, R.E., (1984, 78p.) New Hampshire-Pennel Climate at CRREI, Hamorer, New Hampshire. Bates, R.E., (1984, 78p.) New Hampshire-Pennel Climate at CRREI, Hamorer, New Hampshire. Bates, R.E., (1984, 78p.) New Hampshire-Pennel Comparison of without the control of the Obio River. Obio	Environmental analyses in the Kootenai River region, Mon-	Utilities	Roach, D.A., [1983, p.359-364] MP 2864
Applications of remote sensing in New Bagland. McKing. H.L., et al. (1975, 5p. 1-16 fggs. and tubies) New Hampables New Hamp	-New England		29p. ₃ SE 83-29
New Hampshire Comparison of winter climatic data for three New Hampshire sites. Govoni, J.W., et al., (1966, 78p.) SR \$6-65 New Hampshire—Elanover Clip44, 78p., 1982, 1982. Base 8.E. Clip74, 78p. A48-465 SR \$6-85 Clip74, 78p. A48-465 SR \$6-86	Applications of remote sensing in New England. McKim, H.L., et al., [1975, 8p. + 14 figs. and tables] MP 913	Utility distribution systems in Sweden, Finland, Norway and	ka. Simmons, C.L., et al, [1983, 35p.] CR 83-24
Alleghery River and floods of the Ohio Art. (1994, 782). SR 84-85 Olds Biver	-New Hampshire	SR 76-16	
Construction materials data base for Pittsburgh, P.A. et al. (1994, 1964, 1964, 1965, 1963). Doct, D.S. et al. (1994, 1966, 1975). SR 84-63. Seate Clair River Peror estimate and field measurements at Lake Powell, Utah. Merry, C.J., et al. (1994, 1977, 26-92). CR 77-84. Nerver scales and flooding on Ottanquechee River, et al. (1997, 26-19). MP 1938. Merry River Peror estimates and flooding on Ottanquechee River, versus and flooding on Ottanquechee Rive	sites. Govoni, J.W., et al, [1986, 78p.] SR 86-05	[1977, p.448-468] MIP 930	
Coldinate utilities delivery design manual. Smith, D.W., Cl., et al., (1933, 290). Collinate provide on personance of the Chio River. CR 83-64. Obsolver Coorsprich features and floods of the Ohio River. Barry Coorsprich features and floods of the Ohio River. MP 2025. Cotton, L.W., (1984, p.163-621). Cotton, L.W., (1984, p.164-621). Conservation materials data the sace for Fittsburgh, P.A. Merry, C.L., et al., (1986, p.164-621). Conservation materials data the sace for Fit	Climate at CRRBL, Hanover, New Hampshire. Bates, R.B.,	Utility distribution practices in northern Europe. McFadden, T., et al. (1977, p.70-95) MP 928	Using Landsat data for snow cover/vegetation mapping.
loe growth on Post Pond, 1973-1992. Gow, A.J., et al. (1984, 259-1) Ohls River Geographic features and floods of the Ohio River. Edwards, B.A., et al. (1984, p.265-281). MP 2983 for conditions on the Ohio and Illinois rivers, 1972-1995. Gatto, L.W., (1983, p.356-861) Oregom—Hoel, Meesat Sources mechanism of volcanic tremor. Ferrick, M.G., et al. (1984, 1984, 1987). Description of volcanic tremor. Ferrick, M.G., et al. (1984, 1984, 1987). Personal management of the Allegheny River for control structure, 1973. Desc., D.S., et al. (1984, 1979, 1984). God climate utilities manual. Smith, D.W., ed., (1985, 1984). God climate utilities manual. Smith, D.W., ed., (1986, 1984). God climate utilities manual. Smith, D.W., ed., (1986, 1984). God climate utilities manual. Smith, D.W., ed., (1986, 1984). God climate utilities manual. Smith, D.W., ed., (1986, 1984). God climate utilities manual. Smith, D.W., ed., (1986, 1984). God climate utilities manual. Smith, D.W., ed., (1986, 1984). God climate utilities manual. Smith, D.W., ed., (1986, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). God climate utilities manual. Smith, D.W., ed., (1984, 1984). Go			Wildlife habitat mapping in Lac qui Parle, Minnesota. Mer-
Object Strew Geographic features and floods of the Ohio River. Geographic features and floods of the Ohio River. H.A., et al. [1949, p.265-281] Ge conditions on the Ohio and Illinois rivers, 1972-1985, Gatto, L.W., [1955, p.156-861] Oregon—Head, Moment Sources mechanism of volcanic tremor. Ferrick, M.G., et al. [1926, p.867-3663] MP 1974 Permanylyman—Allegheap River Performance of the Allegheap River ion control structure, 1983. Deck, D.S., et al., [1946, 15p.) SR 84-15 Construction materials data base for Pittsburgh, P.A. Merry, C.J., et al., [1956, p.49-5.2] SR 84-15 Senist Clafe River Port Huron ion control model studies. Calkins, D.J., et al., [1956, p.49-5.2] Water quiply and waste disposal on appearancent amore fields. Reed, S.C., et al. [1944, 128p.) SR, et al., [1946, 15p.) SR 84-15 SR, et al., [1946, 15p.) SR 84-15 North Hard St. Mary River Port Huron ion control model studies. Calkins, D.J., et al., [1956, p.49-52] Varger difficults Reed, S.C., et al., [1944, 128p.) SR 84-15 North Hard St. Mary River Fort Huron ion control model studies. Calkins, D.J., et al., [1956, p.49-52] Varger difficults Reed, S.C., et al., [1944, 128p.) SR, et al., [1956, p.49-52] Varger difficults Reed, S.C., et al., [1944, 128p.) SR, et al., [1956, p.49-52] Varger difficults Reed, S.C., et al., [1944, 128p.) SR, et al., [1956, p.49-52] Varger difficults Reed, S.C., et al., [1944, 128p.) SR, et al., [1956, p.49-52] Varger difficults Reed, S.C., et al., [1944, 128p.) SR, et al., [1956, p.49-52] Varger difficults Reed, S.C., et al., [1944, 128p.) SR, et al., [1956, p.49-52] Varger difficults Reed, S.C., et al., [1956, p.20-10] Varger-Lake Pewall. Varger Lake	Ice growth on Post Pond, 1973-1982. Gow, A.J., et al.	Utility services for remote military facilities. Reed, S.C., et	Revegetation along pipeline rights-of-way in Alaska. John-
Comparative field testing of buried utility locators. Big. Ide coaditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., [1985, p.355-361) Greate, L.W., [1985, p.355-361) Greated, Moment Greated,	Ohio River	Water supply and waste disposal on permanent snow fields.	
Gatto, L.W., [1985, p.356-361) MF 1914 Coregon—Bleed, Mosmit Source mechanism of volcanic tremor. Ferrick, M.G., et al., [1982, p.673-3683] MF 1876 Permanylvanie—Allegheay River Performance of the Allegheay River ice control structure, 1983. Deck, D.S., et al., [1984, 15p.] SR 84-13 Pennsylvanie—Allegheay River ice control structure, 1983. Deck, D.S., et al., [1984, 15p.] SR 84-13 Pennsylvanie—Bleedy River Construction materials data base for Pittaburgh, P.A. Merry, C.J., et al., [1986, 87p.] Port River Port Huron ice control model studies. Calkins, D.J., et al., [1996, 87p.] Proce estimates and field measurements of the St. Marys River Force estimates and field measurements of the St. Marys River Port Huron ice control model studies. Calkins, D.J., et al., [1977, 26p.] Publish—Lake Pewall Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 38p.] Permanylation of the St. Marys River Port Minter thermal structure and ice conditions on Lake Champlein Winter thermal structure and ice conditions on Lake Champlein, Vermonst. Bates, R.E., [1976, 22p.] Permanylation of vermonst structure, 1982, 23p.] Permanylation of vermonst structure, 1982, 23p.] Permanylation of vermonst structure, 1982, 23p.] Permanylation of dry snow. Colbeck, S.C., [1980, p.231-530] Permanylation of dry snow. Colbeck, S.C.	H.A., et al, [1984, p.265-281] MIP 2003		
Source mechanism of volcanic tremor. Ferrick, M.G., et al. (1982, p.8675-8683) MP 1576 Pewanylyrasia—Allegheay River ice control structure, 1983. Deck, D.S., et al. (1984, 15p.) SR 84-15 Personance of the Allegheay River ice control structure, 1983. Deck, D.S., et al. (1984, 15p.) SR 84-15 Personal construction materials data base for Pittsburgh, PA. Merry, C.J., et al. (1986, 87p.) SR 84-15 Rossiat Clafe River Port fluros lee control model studies. Calkins, D.J., et al. (1982, p.361-375) SR 84-15 SR 84-15 Personance of the Allegheay River ice control model studies. Calkins, D.J., et al. (1982, p.361-375) SR 84-15 Personance of the Allegheay River ice control model studies. Calkins, D.J., et al. (1982, p.361-375) SR 84-15 SR 84-15 Personance of the Allegheay River ice control model studies. Calkins, D.J., et al. (1982, p.361-375) SR 84-15 SR 84-15 SR 84-15 Personance of the Allegheay River ice control model studies. Calkins, D.J., et al. (1982, p.361-375) SR 84-15 SR 84-15 NP 1285 Personance of the Allegheay River ice control model studies. Calkins, D.J., et al. (1984, p.361-375) SR 84-15 NP 1285 Personance of the Allegheay River ice control model studies. Calkins, D.J., et al. (1977, 25p.) SR 87-24 NP 1285 NP 1285 NP 1285 NP 1285 NP 1386 NP 1285 NP 1386 NP 1285 NP 1386 NP 1285 NP 1386 NP 13	Ice conditions on the Ohio and Illinois rivers, 1972-1985. Gatto, L.W., 1985, p.856-861, MP 1914		region, Alaska, Walker, D.A., r1985, 239p.;
Performance of the Allegheary River ice control structure, 1983. Doct, D.S., et al., 1984, 15p.; Pessanyivasia—Pitzubargh Construction materials data base for Pitzubargh, PA. Merry, CJ., et al., 1986, 75p.; SR 84-13 Pessanyivasia—Pitzubargh Construction materials data base for Pitzubargh, PA. Merry, CJ., et al., 1986, 75p.; SR 84-68 Seatet Clade River Port Furon ice control model studies. Calkins, D.J., et al., 1982, 75p.; Port Muron ice control model studies. Calkins, D.J., et al., 1987, 26p.; CR 77-64 —Utah—Lake Pewell Water quality measurements of the St. Marya River CJ., 1977, 38p.; Verment—Lake Champlains Winter themal structure and ice conditions on Lake Champlain, Vermonat. Bates, R.B., 1976, 22p.; CVerment—Chtempaches River Cottangueches River Cottangueches River—analysis of freeze-up processes. Ching, D.J., et al., 1982, 25p.; CM 76-13 Ching D.J., et al., 1984, 27-277; MF 1815 Composition of vapors evolved from military TNT. Leggett, et al., 1974, 22-47-277; Merruny contamination of freeze-up on the Ottauqueches River et. Calkins, D.J., et al., 1984, 1924-277; MF 1815 Composition of vapors evolved from military TNT. Leggett, et al., 1974, 27-277. MF 1815 Thermal observations of Mt. St. Heisens before and during eruption. St. Lawrence, W.F., et al., 1980, p. 138-139; Conservations of volcanic trenor at Mount St. Heisens volcans. MF 1282 (1986, 1997, 25p.; SR 84-13 MF 1283 Construction materials data base for Pitzuburgh, PA. Merry, CJ., 1973, p. 135-141; MF 1285 Vapor pressure Remote-reading tensionseter for use in subfreezing tempera- Remote-reading tensionseter f		CR 84-31	Effect and disposition of TNT in a terrestrial plant. Palazzo,
Performance of the Allegheny River ice control structure, 1983. Deck, D.S., et al., [1984, 15p.] Pennsylvanie—Pittshurgh Construction materials data base for Pittsburgh, P.A. Merry, C.J., et al., [1986, 87p.] SR 86-46 Sealest Cale River Port Huron ice control model studies. Calkins, D.J., et al., [1986, 87p.] RP 1315 AMP 1326 SR 86-16 Sealest Caler River Port Huron ice control model studies. Calkins, D.J., et al., [1970, p.135-141] NP 1986 Porce estimate and field measurements of the St. Marys River ice booms. Perham, R.B., [1977, 26p.] CR 77-49 Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 38p.] Verment—Lake Champinian Winter thermal structure and ice conditions on Lake Champinian, Vermont. Bates, R.B., [1976, 22p.] Verment—Lake Champinian Winter thermal structure and ice conditions on Lake Champinian, Vermont. Bates, R.B., [1976, 22p.] CR 76-13 Ottom of the Allegheny River ice control model studies. SR 77-28 Non-Bold Merry, C.J., et al., [1980, p.29-130] Non-Bold Merry, C.J., et al., [1971, p.17-181] Non-Bold Merry, C.J., et al., [1971, p.17-181] Non-Bold Merry, C.J., et al., [1977, p.19-190] Theory of metamorphism of dry snow. Colbeck, S.C., [1984, CR 84-65] Theory of metamorphism of dry snow. Colbeck, S.C., [1984, CR 84-65] NP 108 Acrossle General River Theory of metamorphism of dry snow. Colbeck, S.C., [1984, CR 84-65] NP 108 Acrossle General River and Indicate the St. Marys River of the St. Mar	[1982, p.8675-8683] MP 1576	[1986, 10p.] MP 2021	Vegetation patterns
Construction materials data base for Pittaburgh, PA. Merry, CJ., et al., [1986, 87p.] SR 86-08 -Beinst Clear River Port Huron ice control model studies. Calkins, D.J., et al., et a	Performance of the Allegheny River ice control structure,	var.p.j MP 2135	
Construction materials data base for Pittaburgh, PA. Merry, C.J., et al., [1986, 87p.] Saint Clair River Forth Hurno ice control model studies. Calkins, D.J., et al., [1973, 25p.] Select Clair River Force estimates and field measurements of the St. Marys River ice booms. Perham, R.E., [1977, 26p.] CR 77-64 —Utab—Laks Pewell Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 38p.] —Verment—Lake Champlain Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.E., [1976, 22p.] CR 76-13 —Verment—Detampsechee River—analysis of freeze-up on the Ottauquechee River, et al., [1977, 25p.] Ottauquechee River—analysis of freeze-up on the Ottauquechee River. MP 1555 Thermodynamics of snow metamorphism due to variations in curvature. Colbeck, S.C., [1980, p.291-301] MP 1093 Verment—Lake Champlain Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.E., [1976, 22p.] CR 76-13 —Verment—Lake Champlain Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.B., [1976, 22p.] CR 76-13 —Verment—Lake Champlain Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.B., [1976, 22p.] CR 76-13 —Verment—Lake Champlain Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.B., [1976, 22p.] CR 76-13 —Verment—Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ice conditions on Lake Champlain Winter thermal structure and ic			Abiotic overview of the Tundra Biome Program, 1971.
-Select Clair River Port Huron ice control model studies. Calkins, D.J., et al. [1922, p.361-373] -St. Marys River Porce estimate and field measurements of the St. Marys River ice bosoms. Perham, R.E., [1977, 26p.] CR 77-04 -Utah—Lake Pewell Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 38p.] -Verment—Lake Camplain Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.B., [1976, 22p.] CR 76-13 -Verment—Ottengeschee River, VT. Bates, at et al., [1982, 25p.] Composition of vapors evolved from military TNT. Leggett, St. [1984, p.247-277] -Verment—Mert Schat Helens Thermodynamics of snow metamorphism due to variations in curvature. Colbeck, S.C., [1980, p.291-301] MP 1039 -MP 1	Construction materials data base for Pittsburgh, PA. Merry, C.J., et al. 1986, 870.1	fort Sea. Hopkins, D.M., et al, [1979, p.135-141] MP 1288	Permafrost and vegetation maps from BRTS imagery. And-
### Curvature Colbeck, S.C., [1980, p.291-301] ### St. Marys River ### Force estimate and field measurements of the St. Marys River ioe booms. Perham, R.E., [1977, 26p.] CR 77-04 ### Utab—Lake Pewall ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 38p.] SR 77-25 ### Winter thermal structure and ioe conditions on Lake Champlain, Vermont. Bates, R.E., [1976, 22p.] CR 76-13 ### Vermont—Ottasquechee River, VT. Bates, R. et al., [1976, p.31-45] MP 135 ### Porce estimate and field measurements of the St. Marys River ioe booms. Perham, R.E., [1977, 26p.] CR 77-04 ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 38p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 38p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 28p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 28p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 28p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 28p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 28p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 28p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 28p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 28p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1978, 13p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1978, 13p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1978, 13p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1978, 13p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1978, 13p.] ### Water quality measurements at Lake Powell, Utah. Merry, C.J., [1978, 13p.] ### Water quality measurements at Lake Powell, Like Powell and tracked vehicle traffic on tundra at Lake Powell and tracked vehicle traffic on tundra at Lake Powell and t	Saint Clair River		Vegetative research in arctic Alaska. Johnson, P.L., et al,
Person estimate and field measurements of the St. Marys River ice booms. Perham, R.E., [1977, 26p.] CR 77-44 —Utab—Lake Pewell Water quality measurements at Lake Powell, Utah. Merry, C.J., [1977, 38p.] —Verment—Lake Champlein Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.E., [1976, 22p.] CR 76-13 —Verment—Ottanquechee River, VT. Bates, R. et al., [1976, 22p.] CR 78-13 Composition of vapors evolved from military TNT. Legett, M.P 105 Ottanquechee River—analysis of freeze-up processes. Calkins, D.J., [1984, p.247-277] NTP 1735 Numerical simulation of vegetation in New England. McKim, H.L., et al., [1978, 13p.] Taylor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Ottanquechee River—analysis of freeze-up processes. Calkins, D.J., [1984, p.247-277] MCP 1735 Numerical simulation of vegetation in New England. McKim, H.L., et al., [1978, 13p.] Taylor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor pressure of TNT by gas chromatography. Leggett, M.P 297 Vapor	[1982, p.361-373] MP 1530	curvature. Colbeck, S.C., [1980] p.291-301]	Land use/vegetation mapping in reservoir management.
Light — Lake Pewall Water quality measurements at Lake Powell, Utah. Water quality measurements at Lake Powell, Utah. Water quality measurements at Lake Powell, Utah. Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.B., [1976, 22p.] Vermont. Bates, R.B., [1976, 22p.] Varmont. Bates, R.B., [1976, p.31-45] Varmont. B		Theory of metamorphism of dry snow. Colbeck, S.C.,	
Water quality measurements at Lake Powell, Utah. Merry, C.J., (1977, 33p.) SR 77-26 Vermont—Lake Champlela Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.B., (1976, 22p.) CR 76-13 Vermont—Ottanquechee River, VT. Bates, R. SR 52-06 Ottanquechee River—enalysis of freeze-up processes. Calkins, D.J., (1982, p.2-37) NP 1815 Numerical simulation of freeze-up on the Ottanquechee River, Calkins, D.J., (1984, p.247-277) NP 1815 Thermal observations of Mt. St. Helens before and during cruption. St. Lawrence, W.F., et al., (1980, p.1526-1527) NP 1815 Otservations of volcanic tremor at Mount St. Helens volcano. NP 1815 Other vermont is at Lake Powell, Utah. Merry, C.J., (1977, p.33-95) SR 77-26 Vapor pressure for use in subfreezing temperature. McKim, H.L., et al., (1976, p.31-45) MP 1875 Vapor pressure of TNT by gas chromatography. Leggett, MP 2875 Composition of vapors evolved from military TNT. Leggett, SR 77-16 SR 77-26 Ottanquechee River—enalysis of freeze-up on the Ottanquechee River. Calkins, D.J., (1984, p.247-277) MP 1815 Thermal Structure and ice conditions on Lake Champlain, Vermont. Bates, R., (1976, p.31-45) MP 1829 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chromatography. Leggett, MP 2877 Vapor pressure of TNT by gas chroma	ice booms. Perham, R.E., [1977, 26p.] CR 77-04		al, (1978, 13p.) MP 1169
Winter thermal structure and ice conditions on Lake Champlain, Vermont. Bates, R.B., [1976, 22p.] CR 76-13 —Vermont—Ottanquechee River Logiams and flooding on Ottanquechee River, VT. Bates, R.B., [1982, 25p.] Ottanquechee River—analysis of freeze-up processes. Calkins, D.J., et al., [1982, 25p.] Ottanquechee River—analysis of freeze-up on the Ottanquechee River. Calkins, D.J., [1984, p.24-7:277] er. Calkins, D.J., [1984, p.24-7:277] MF 1815 —Washington—Meant Salast Halens Thermal observations of Mt. St. Helens before and during cruption. St. Lawrence, W.F., et al., [1980, p.1316-1527, MF 1482 Observations of volcanic tremor at Mount St. Helens volcano. Page 12 (1982, 1982, 1982, 1982, 1982, 1982, 1982) Remotor-reading tensiometer for use in subfreezing temperature. MF 1979 Vapor pressure of TNT by gas chromatography. Loggett, MF 915 Composition of vapors evolved from military TNT. Loggett, D.C., et al., [1977, 25p.] SR 77-16 MF 1770 SR 77-16 MF 1870 Composition of water samples. Cragin, J.H., MP 1270 Growth of faceted crystals in a snow cover. Colbeck, S.C., [1981, 1982, 199.] Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 199.] Condensation control in low-alope roofs. Tobiasson, W., MP 2009 Vermont—Lake Champles American, MF 987 MP 1875 Continuous of water samples. Cragin, J.H., MP 1270 Growth of faceted crystals in a snow cover. Colbeck, S.C., [1981, 1912] Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 199.] Condensation control in low-alope roofs. Tobiasson, W., MP 2009 Vermont—Vermont—MCMM, MF 1875 Continuous of Mt. St. Helens before and during cruption. St. Lawrence, W.F., et al., [1980, p.131-65] MF 1482 Continuous of water samples. Cragin, J.H., MP 1270 Growth of faceted crystals in a snow cover. Colbeck, S.C., [1981, 18p.] Growth of faceted crystals in a snow cover. Colbeck, S.C., [1982, 199.] Condensation control in low-alope roofs. Tobiasson, W., MP 2009 Vermont—American Abele, C., [1976, p.186-215) MF 1870 MF 1870 MF 1870 MF	Water quality measurements at Lake Powell, Utah. Merry,	21p. _J Cil 84-86	Bverett, K.R., et al, [1978, p.359-365] MP 1096
plain, Vermont. Bates, R.B., [1976, 22p.] CR 76-13 —Vermont—Ottanguachee River Los jams and flooding on Ottauquachee River, VT. Bates, R., [1977, p.83-90] Ottauquachee River—analysis of freeze-up processes. Calkins, D.J., et al., [1982, p.2-37] Numerical simulation of freeze-up on the Ottauquachee River. Calkins, D.J., [1984, p.247-277] WP 1815 —Washingtes—Meant Seinst Helens Thermal observations of Mt. St. Helens before and during eruption. St. Lawrence, W.F., et al., [1980, p.1326-1527, MP 2429 Otherwations of volcanic tremor at Mount St. Helens volcano. Vapor pressure of TNT by gas chromatography. Leggett, MP 915 Composition of vapors evolved from military TNT. Leggett, D.C., et al., [1977, 25p.] Composition of vapors evolved from military TNT. Leggett, D.C., et al., [1977, 25p.] SR 77-16 D.C., et al., [1977, 25p.] SR 77-16 D.C., et al., [1977, 25p.] SR 77-16 SR \$2-46 Composition of vapors evolved from military TNT. Leggett, D.C., et al., [1977, 25p.] SR 77-16 SR \$1-16 D.C., et al., [1977, 25p.] SR 77-16 Workshop on snow traction mechanics, 1979. Harrison, CR 82-29 Condensation control devices. MP 915 MP 1270 Growth of faceted crystals in a know cover. Colbeck, S.C., CR 82-29 Condensation control flowers. MP 915 SR 77-16 Workshop on snow traction mechanics, 1979. Harrison, CR 82-29 Condensation control devices. MP 915 MP 1270 Growth of faceted crystals in a know cover. Colbeck, S.C., CR 82-29 Condensation control devices. MP 915 MP 1270 Growth of faceted crystals in a know cover. Colbeck, S.C., CR 82-29 Condensation control devices. MP 915 MP 1270 Growth of faceted crystals in a know cover. Colbeck, S.C., CR 82-29 Condensation control devices. MP 915 Beffects of low ground contact directional control devices. MP 915 MP 1270 W.L., ed, [1981, 71p.] Predicting wheeled vehicle motion resistance in shallow. CR 82-29 Condensation control devices. MP 915 SR 77-31 MP 1270 Growth of faceted crystals in a know cover. Colbeck, S.C., CR 82-29 Condensation control devices. MP	-Verment-Lake Chemplain	Remote-reading tensiometer for use in subfreezing tempera-	Effects of hovercraft, wheeled and tracked vehicle traffic on
-Vermont-Ottanguechee River Logisms and flooding on Ottanguechee River, VT. Bates, R., et al., [1982, 259.] Ottanguechee River—analysis of freeze-up processes. Cal. kins, D.J., et al., [1987, p.23-37] Numerical simulation of freeze-up on the Ottanguechee River. Calkins, D.J., [1984, p.247-277] Wer. Calkins, D.J., [1984, p.247-277] WP 1815	Winter thermal structure and ice conditions on Lake Cham- plain, Vermont. Bates, R.B., [1976, 22p.] CR 76-13		
Ottanqueches River—analysis of freeze-up processes. Calkins, D.J., et al., [1982, p.2-37, MP 1738] Numerical simulation of freeze-up on the Ottanqueches River.	-Verment-Ottanquechee River	D.C., (1977, p.83-90) MIP 915	Abele, G., [1976, p.51-59] MIP 875
kins, D.J., et al, [1982, p.2-37] MP 1738 Numerical simulation of freeze-up on the Ottauquechee Rivers. er. Calkins, D.J., [1984, p.247-277] MP 1815	et al, [1982, 25p.] SR 82-06		Lonely, Alaska. Abele, G., et al, [1977, 32p.]
er. Calkins, D.J., [1984, p.247-277] MP 1815	kina, D.J., et al, (1982, p.2-37) MP 1738	Mercury contamination of water samples. Cragin, J.H.,	Workshop on snow traction mechanics, 1979. Harrison,
Thermal observations of Mt. St. Helens before and during eruption. St. Lawrence, W.F., et al., [1980, p.1526-1527, MP 2492 Observations of volcanic tremor at Mount St. Helens volcanic. Condensation control in low-slope roofs. Tobiason, W., [1985, p.9-20] WP 2494 (1985, p.47-59) Wegetation Observations of volcanic tremor at Mount St. Helens volcanic. Ploeline haul road between Livengood and the Yukon River. Bearing capacity of river ice for vehicles. Nevel, D.E.,	or. Calkina, D.J., [1984, p.247-277] MP 1815	Growth of faceted crystals in a know cover. Colbeck, S.C.,	Predicting wheeled vehicle motion resistance in shallow
eruption. St. Lawrence, W.F., et al., [1980, p.1526-1527, [1985, p.47-59] MP 2039 G.L., [1985, p.9-20] MP 2044 Well-cles Observations of volcanic tremor at Mount St. Helens volcano. Pipeline haul road between Livengood and the Yukon River. Bearing capacity of river ice for vehicles. Nevel, D.E.,		Condensation control in low-slope roofs. Tobiasson, W.,	Vehicle for cold regions mobility measurements. Blaisdell,
Observations of volcanic tremor at Mount St. Helens volcano. Pipeline haul road between Livengood and the Yukon River. Bearing capacity of river ice for vehicles. Nevel, D.E.,	eruption. St. Lawrence, W.F., et al, [1980, p.1526-1527]	(1985, p.47-59) MP 2039	G.L., [1985, p.9-20] MP 2044
rement, wit, [1364] by-1-10-3-6-4] wit, [1/4 met. [1/4 met. [13/6], [13/6] SW (4-11 [13/6], 24b/] CW (4-03			

		the second of th
Vehicles (cost.)	Volcanoes Undervise temperature a seismin servere in volcaness and als	Nitrogen transformations in land treatment. Jenkins, T.F et al, [1979, 32p.] SR 79-3
Application of energetics to vehicle trafficability problems. Brown, R.L., [1981, p.25-38] MIP 1474	Hydraulic transients: a seismic source in volcances and gla- ciers. St. Lawrence, W.P., et al., [1979, p.654-656]	Bacterial aerosols resulting from wastewater irrigation is
Snow measurements in relation to vehicle performance.	MP 1181	Ohio. Bausum, H.T., et al, [1979, 64p.] SR 79-3
Harrison, W.L., [1981, p.13-24] MP 1473	Thermal observations of Mt. St. Helens before and during eruption. St. Lawrence, W.F., et al, [1980, p.1526-1527]	Land application of wastewater: effect on soil and plant potas sium. Palazzo, A.J., et al, (1979, p.309-312)
Prediction methods for vehicle traction on snow. Harrison, W.L., (1981, p.39-46) MP 1475	MP 1482	MP 122
Field investigations of vehicle traction in snow. Harrison,	Fluid dynamic analysis of volcanic tremor. Ferrick, M.G., et	Utilization of sewage sludge for terrain stabilization in col-
W.L., [1981, p.47-48] MP 1476	al, [1982, 12p.] CR 82-32	Utilization of sewage sludge for terrain stabilization in col- regions. Pt. 3. Rindge, S.D., et al, [1979, 33p.] SR 79-3
Shallow snow test results. Harrison, W.L., [1981, p.69-71] MP 1478	Source mechanism of volcanic tremor. Ferrick, M.G., et al, 1982, p.8675-8683	Dynamics of NH4 and NO3 in cropped soils irrigated with
Macroscopic view of snow deformation under a vehicle.	Observations of volcanic tremor at Mount St. Helens volcano.	wastewater. Iskandar, I.K., et al, [1980, 20p.]
Richmond, P.W., et al, [1981, 20p.] SR \$1-17	Fehler, M., [1984, p.3476-3484] MIP 1776	SR 80-2 Waste heat utilization through soil heating. McFadden, T
Vehicle tests and performance in snow. Berger, R.H., et al.	Volumetric constitutive law for snow under strain. Brown,	et al, [1980, p.105-120] MP 136
(1981, p.51-67) MP 1477 Mahility hibitography Liston N comp. (1981, 313n.)	R.L., [1979, 13p.] CR 79-20	Effectiveness of land application for P removal from wast
Mobility bibliography. Liston, N., comp, [1981, 313p.] SR 81-29	Walls	water. Iskandar, I.K., et al, [1980, p.616-621] MIP 144
Engine starters in winter. Coutts, H.J., [1981, 37p.]	Investigation of water jets for lock wall deicing. Calkins,	Hydraulic characteristics of the Deer Creek Lake land treat
SR 81-32	D.J., et al, (1976, p.G2/13-22) MP 865 lee removal from the walls of navigation locks. Franken-	ment site during wastewater application. Abele, G., et a
CRREL instrumented vehicle for cold regions mobility measurements. Blaisdell, G.L., [1982, 11p.] MP 1515	stein, G.E., et al, [1976, p.1487-1496] MP 888	[1981, 37p.] CR 81-6' Seasonal growth and uptake of nutrients by orchardgrass irri
Measurement of snow surfaces and tire performance evalua-	Reinsulating old wood frame buildings with urea-formalde-	gated with wastewater. Palazzo, A.J., et al, [1981, 19p.]
tion. Blaisdell, G.L., et al, [1982, 7p.] MP 1516	hyde foam. Tobiasson, W., et al, [1977, p.478-487] MP 958	CR 81-4
CRREL instrumented vehicle: hardware and software. Blaisdell, G.L., [1983, 75p.] SR 83-63	Roof moisture survey-U.S. Military Academy. Korhonen,	Site selection methodology for the land treatment of wastews ter. Ryan, J.R., et al, [1981, 74p.] SR 81-2
Vechicle mobility and snowpack parameters. Berger, R.H.,	C., et al, [1979, 8 refs.] SR 79-16	Wastewater applications in forest ecosystems. McKim
[1983, 26p.] CR 83-16	Measuring building R-values for large areas. Flanders, S.N., et al, [1981, p.137-138] MP 1388	H.L., et al, [1984, 22p.] CR 82-1
Velocity	Toward in-situ building R-value measurement. Planders,	Mathematical simulation of nitrogen interactions in soils
Critical velocities of a floating ice plate subjected to in-plane forces and a moving load. Kerr, A.D., [1979, 12p.]	S.N., et al, [1984, 13p.] CR 84-61	Selim, H.M., et al, [1983, p.241-248] MP 265 Water supply and waste disposal on permanent snow fields
CR 79-19	Heat flow sensors on walls-what can we learn. Flanders,	Reed, S.C., et al, [1984, p.401-413] MP 171-
Measurement of the shear stress on the underside of simulated	S.N., (1985, p.140-149) MP 2042 Measured and expected R-values of 19 building envelopes.	Observations during BRIMFROST 83. Bouzoun, J.R., et a
ice covers. Calkins, D.J., et al, [1980, 11p.]	Flanders, S.N., [1985, p.49-57] MP 2115	[1984, 36p.] SR 84-1
Plow velocity profiles in ice-covered shallow streams. Cal-	Waste disposal	Utility services for remote military facilities. Reed, S.C., e al, [1984, 66p.] SR 84-1-
kins, D.J., et al, (1982, p.236-247) MP 1549	Land disposal: state of the art. Reed, S.C., [1973, p.229-	Impact of dredging on water quality at Kewaunce Harbon
Ventilistion	261 ₁ MP 1392	Wisconsin. Iskandar, I.K., et al, [1984, 16p.]
Venting of built-up roofing systems. Tobiasson, W., r1981, p.16-21, MP 1498	Land treatment in relation to waste water disposal. Howells, D.H., et al, (1976, p.60-62) MP 869	CR 84-2 Chemical analysis of munitions wastewater. Jenkins, T.F., e
Can wet roof insulation be dried out. Tobiasson, W., et al,	Wastewater reuse at Livermore, California. Uiga, A., et al.	al, [1984, 95p.] CR 84-2
[1983, p.626-639] MP 1509	[1976, p.511-531] MP 870	Water supply and waste disposal in Greenland and Antarc
Very low frequencies	Effect of open water disposal of dredged sediments. Blom, B.B., et al, (1976, 183p.) MP 967	tica. Reed, S.C., et al, [1985, p.344-350] MP 179 Literature review: effect of freezing on hazardous waste site
Numerical studies for an airborne VLF resistivity survey. Arcone, S.A., (1977, 10p.) CR 77-05	Utility distribution systems in Iceland. Aamot, H.W.C.,	Iskandar, I.K., et al. [1985, p.122-129] MP 202
VLF airborne resistivity survey in Maine. Arcone, S.A.,	[1976, 63p.] SR 76-05	Thermal analysis of a shallow utilidor. Phetteplace, G., et a
[1978, p.1399-1417] MP 1166	Reclamation of wastewater by application on land. Iskandar, I.K., et al. (1976, 15p.) MP 896	[1986, 10p.] MP 202
Vibration Analysis of syntactically assessed around motions wise	1.K., et al, [1976, 15p.] MIP 896 Urban waste as a source of heavy metals in land treatment.	Waste treatment Waste management in the north. Rice, E., et al, [1974,
Analysis of explosively generated ground motions using Fourier techniques. Blouin, S.E., et al, [1976, 86p.]	Iskandar, I.K., [1976, p.417-432] MP 977	p.14-21 ₁ MP 104
CR 76-28	Field performance of a subsectic utilidor. Reed, S.C.,	Land treatment of wastewaters. Reed, S.C., et al, 1974,
Vibrations caused by ship traffic on an ice-covered waterway. Haynes, F.D., et al, (1981, 27p.) CR 81-85	[1977, p.448-468] MP 930 Effects of wastewater on the growth and chemical composi-	p.12-13 ₁ MP 103
Vibration analysis of the Yamachiche lightpier. Haynes,	tion of forages. Palazzo, A.J., [1977, p.171-180]	Land treatment of wastewaters for rural communities. Reco S.C., et al, (1975, p.23-39) MP 139
F.D., (1986, p.238-241) MP 1989	MP 975	Land treatment in relation to waste water disposal. Howelli
Viscoelasticity	Wastewater treatment at Calumet, Michigan. Baillod, C.R., et al, [1977, p.489-510] MP 976	D.H., et al. [1976, p.60-62] MP 86
Viscoelasticity of floating ice plates subjected to a circular load. Takagi, S., [1978, 32p.] CR 78-05	Land treatment of wastewater at Mantecs, Calif., and Quincy,	Land treatment of wastewater. Murrmann, R.P., et a (1976, 36p.) MIP 92
Acoustic emission and deformation response of finite ice	Washington. Iskandar, I.K., et al, [1977, 34p.]	Reclamation of wastewater by application on land. Iskands:
plates. Xirouchakis, P.C., et al, [1981, p.123-133]	CR 77-24	I.K., et al, [1976, 15p.] MP 89
MP 1436 Viscosity	Municipal sludge management: environmental factors. Reed, S.C., ed, [1977, Var. p.] MP 1406	Wastewater renovation by a prototype slow infiltration lan
Seasonal variations in apparent sea ice viscosity on the geo-	Consolidating dredged material by freezing and thawing.	treatment system. Iskandar, I.K., et al, [1976, 44p.] CR 76-1
physical scale. Hibler, W.D., III, et al, [1977, p.87-90]	Chamberlain, E.J., [1977, 94p.] MP 978	Wastewater treatment in cold regions. Sletten, R.S., et a
MP 900	Land treatment of wastewater at West Dover, Vermont. Bouzoun, J.R., [1977, 24p.] SR 77-33	[1976, 15p.] MP 96
Compression of wet snow. Colbeck, S.C., et al, 1978, 17p. ₁ CR 78-10	Methodology for nitrogen isotope analysis at CRREL. Jen-	Overview of land treatment from case studies of existing systems. Uiga, A., et al. (1976, 26p.) MP 89
Some results from a linear-viscous model of the Arctic ice	kins, T.F., et al, [1978, 57p.] SR 78-06	Land treatment of wastewater at a subarctic Alaskan location
cover. Hibler, W.D., III, et al, [1979, p.293-304]	Lysimeters validate wastewater renovation models. Iskan-	Sletten, R.S., et al, [1976, 21p.] MP 86
MP 1241 Grouting silt and sand at low temperatures. Johnson, R.,	dar, I.K., et al., [1978, 11p.] SR 78-13 Waste water reuse in cold regions. Iskandar, I.K., [1978,	Land treatment of wastewater in subarctic Alaska. Sletter R.S., et al, [1977, p.533-547] MIP 126
[1979, p.937-950] MIP 1078	p.361-368 ₃ MP 1144	Wastewater reuse at Livermore, California. Uiga, A., et a
Modeling mesoscale ice dynamics. Hibler, W.D., III, et al.	Effects of wastewater and sludge on turigrasses. Palazzo,	(1977, p.511-531) MIP 97
[1981, p.1317-1329] MIP 1526 Analysis of linear sea ice models with an ice margin. Lep-	A.J., (1978, 11p.) SR 78-20 Land treatment climatic survey at CRREL. Bilello, M.A., et	Municipal sludge management: environmental factor Reed, S.C., ed, [1977, Var. p.] MP 140
pitranta, M., [1984, p.31-36] MP 1782	al, (1978, 37p.) SR 78-21	Wastewater treatment alternative needed. Iskandar, I.K., o
Viscens flow	Wastewater stabilization pond linings. Middlebrooks, B.J.,	al, [1977, p.82-87] MP 96
Viscous wind-driven circulation of Arctic sea ice. Hibler, W.D., III, et al, [1977, p.95-133] MP 983	et al, [1978, 116p.] SR 78-28	Land treatment module of the CAPDET program. Merry C.J., et al., [1977, 4p.] MP 111
Modeling pack ice as a viscous-plastic continuum. Hibler.	Experimental system for land renovation of effluent. Ny- lund, J.R., et al, [1978, 26p.] SR 78-23	C.J., et al, [1977, 4p.] MP 111 Land application of wastewater in permafrost areas. Sletter
W.D., III, [1977, p.46-55] MP 1164	Computer file for existing land application of wastewater sys-	R.S., [1978, p.911-917] MIP 111
Thermodynamic model of creep at constant stress and con-	tems. Iskandar, I.K., et al, [1978, 24p.] SR 78-22	Land treatment: present status, future prospects. Pound
stant strain rate. Fish, A.M., [1984, p.143-161] MP 1771	Cold climate utilities delivery design manual. Smith, D.W., et al, [1979, c300 leaves] MP 1373	C.E., et al., (1978, p.98-102) MP 141 Overview of existing land treatment systems. lakandar, I.K.
Visibility	Kinetics of denitrification in land treatment of wastewater.	(1978, p.193-200) MP 115
Ice fog suppression in Arctic communities. McPadden, T.,	Jacobson, S., et al, [1979, 59p.] SR 79-84	Performance of overland flow land treatment in cold climate
[1980, p.54-65] MP 1357 Suppression of ice fog from the Fort Wainwright, Alaska,	Energy requirements for small flow wastewater treatment sys- tems. Middlebrooks, E.J., et al, [1979, 82p.]	Jenkins, T.F., et al. (1978, p.61-70) MP 115 Microbiological aerosols during wastewater irrigation. Bat
cooling pond. Walker, K.E., et al, 1982, 34p.	SR 79-07	sum, H.T., et al, (1978, p.273-280) MIP 115
SR 82-23	Spray application of wastewater effluent in Vermont. Cas-	Remote sensing for land treatment site selection. Merry
Explosive obscuration sub-test results at the SNOW-TWO field experiment. Ebersole, J.F., et al., [1984, p.347-354]	sell, B.A., et al. (1979, 38p.) SR 79-06	C.J., [1978, p.107-119] MP 114
MP 1872	Design procedures for underground heat sink systems. Stub- stad, J.M., et al, [1979, 186p. in var. pagns.]	Symposium on land treatment of wastewater, CRREL, Au 1978. (1978, 2 vols.) MP 114
Clear improvement in obscuration. Palmer, R.A., 1985,	SR 79-04	Nitrogen behavior in land treatment of wastewater: a simple
p.476-477; MP 2067 Metapoplopical variation of atmospheric optical properties in	Freezing problems with wintertime wastewater spray irrigs-	Nitrogen behavior in land treatment of wastewater: a simple fied model. Selim, H.M., et al, (1978, p.171-179) MP 114
Meteorological variation of atmospheric optical properties in an antarctic storm. Egan, W.G., et al, (1986, p.1155-	tion. Bouzoun, J.R., [1979, 12p.] SR 79-12 Land treatment systems and the environment. McKim,	Computer procedure for comparing wastewater treatmen
1165 ₇ MP 2099	H.L., et al, (1979, p.201-225) MP 1414	systems. Spaine, P.A., et al, [1978, p.335-340]
Volcanic ach	Soil characteristics and climatology during wastewater ap-	MP 115
Byrd Land quaternary volcanism. LeMasurier, W.B., [1972, p.139-141] MP 994	plication at CRREL. Iakandar, I.K., et al, [1979, 82p.] SR 79-23	Adaptability of forage grasses to wastewater irrigation Palazzo, A.J., et al, [1978, p.157-163] MP 115

Mass water balance during spray irrigation with wastewater at	Overland flow: an alternative for wastewater treatment.	Water
Deer Creek Lake land treatment site. Abele, G., et al,	Martel, C.J., et al, (1982, p.181-184) MP 1596	Continuous monitoring of total dissolved gases, a feasibility
[1978, 43p.] SR 79-29	Heat pumps to recover heat from waste treatment plants.	study. Jenkins, T.F., (1975, p.101-105) MP 85
Experimental system for land renovation of effluent. Ny- lund, J.R., et al, [1978, 26p.] SR 78-23	Martel, C.J., et al, [1982, 23p.] SR 82-10	Effects of wastewater application on forage grasses. Palazzo
Pive-year performance of CRREL land treatment test cells.	P removal during land treatment of wastewater. Ryden, J.C., et al, [1982, 12p.] SR 82-14	A.J., 1976, 8p., CR 76-39 Proceedings of the second planetary water and polar pro
Jenkina, T.F., et al, (1978, 24p.) SR 78-26	Land treatment of wastewater. Reed, S.C., [1982, p.91-	cesses colloquium, 1978. [1978, 209p.] MP 1193
Land treatment climatic survey at CRREL. Bilello, M.A., et	123 ₁ MP 1947	Measurement of the shear stress on the underside of simulated
al, (1978, 37p.) SR 78-21 Health aspects of water reuse in California. Reed, S.C.,	Wastewater treatment in Alaska. Schneiter, R.W., et al, [1982, p.207-213] MP 1696	ice covers. Calkins, D.J., et al, [1980, 11p.] CR 80-2
[1979, p.434-435] MP 1404	Heating enclosed wastewater treatment facilities with heat	Horizontal infiltration of water in porous materials. Nakano
Energy requirements for small flow wastewater treatment sys-	pumps. Martel, C.J., et al, [1982, 20p.] MP 1976	Y., (1982, p.156-166) MP 184
tems. Middlebrooks, E.J., et al, [1979, 82p.]	Wastewater applications in forest ecosystems. McKim,	Water belance
Nitrification inhibitor in land treatment of wastewater in cold	H.L., et al, [1982, 22p.] CR 82-19 User's index to CRREL land treatment computer programs	Scientists visit Kolyma Water Balance Station in the USSR
regions. Bigawhary, S.M., et al, [1979, 25p.]	and data files. Berggren, P.A., et al, (1982, 65p.)	Slaughter, C.W., et al., [1977, 66p.] SR 77-1: Subarctic watershed research in the Soviet Union. Slaugh
SR 79-18	SR 82-26	ter, C.W., et al, (1978, p.305-313) MIP 127:
Program problems with wintertime wastewater spray irrigation. Bouzoun, J.R., [1979, 12p.] SR 79-12	Energy conservation and water pollution control facilities. Martel, C.J., et al, [1982, 18p.] SR 82-24	Mass water balance during spray irrigation with wastewater a
Cost-effective use of municipal wastewater treatment ponds.	Wastewater treatment by nutrient film technique. Bouzoun,	Deer Creek Lake land treatment site. Abele, G., et al [1978, 43p.] SR 79-29
Reed, S.C., et al. [1979, p.177-200] MP 1413	J.R., et al, [1982, 34p.] SR 82-27	Water chemistry
Water movement in a land treatment system of wastewater by	Case study of land treatment in a cold climate—West Dover,	Land treatment of wastewater. Murrinann, R.P., et al
overland flow. Nakano, Y., et al, [1979, p.185-206] MP 1285	Vermont. Bouzoun, J.R., et al, [1982, 96p.]	[1976, 36p.] MP 920
International and national developments in land treatment of	Assessment of the treatability of toxic organics by overland	Effect of open water disposal of dredged sediments. Blom B.E., et al, [1976, 183p.] MP 967
wastewater. McKim, H.L., et al. (1979, 28p.)	flow. Jenkins, T.F., et al, [1983, 47p.] CR 83-63	B.E., et al, [1976, 183p.] MP 96' Reclamation of wastewater by application on land. Iskandar
MP 1420	Microbiological aerosols from waste water. Bausum, H.T., et al, £1983, p.65-75; MIP 1578	I.K., et al, [1976, 15p.] MP 890
Health aspects of land treatment. Reed, S.C., [1979, 43p.] MP 1389	Corps of Engineers land treatment of wastewater research	Baseline data on the oceanography of Cook Inlet, Alaska
Design of liquid-waste land application. Iskandar, I.K.,	program: an annotated bibliography. Parker, L.V., et al,	Gatto, L.W., [1976, 84p.] CR 76-29
[1979, p.65-88] MP 1415	[1983, 82p.] SR 83-69	Effects of wastewater application on forage grasses. Palazzo A.J., [1976, 8p.] CR 76-39
Cost of land treatment systems. Reed, S.C., et al, 1979,	Model for land treatment, Pt.1. Baron, J.A., et al, [1983, 35p.]	Rapid infiltration of primary sewage effluent at Fort Devens
135p. ₁ MP 1387 Land application of wastewater: effect on soil and plant potas-	Model for land treatment planning, design and operation,	Massachusetts. Satterwhite, M.B., et al, [1976, 34p.]
sium. Palazzo, A.J., et al, [1979, p.309-312]	Pt.3. Baron, J.A., et al, [1983, 38p.] SR 83-08	CR 76-41
MP 1228	Model for land treatment planning, design and operation,	Effects of wastewater on the growth and chemical composi- tion of forages. Palazzo, A.J., [1977, p.171-180]
Land treatment of waste water in cold climates. Jenkins, T.F., et al. (1979, p.207-214) MP 1279	Pt.2. Baron, J.A., et al, t1983, 30p.; SR 83-07 Nitrogen removal in wastewater stabilization ponds. Reed,	MP 97
T.F., et al, [1979, p.207-214] MP 1279 Prototype wastewater land treatment system. Jenkins, T.F.,	S.C., (1983, 13p. + figs.) MP 1943	Wastewater treatment at Calumet, Michigan. Baillod, C.R.
et al, [1979, 91p.] SR 79-35	Wastewater treatment and reuse process for cold regions.	et al, (1977, p.489-510) MP 976
Enzyme kinetic model for nitrification in soil amended with	Bouzoun, J.R., [1983, p.547-557] MP 2112	Determination of TNT in water by conversion to nitrate Leggett, D.C., [1977, p.880] MP 980
ammonium. Leggett, D.C., et al, [1980, 20p.] CR 88-01	Land application systems for wastewater treatment. Reed, S.C., [1983, 26p. + figs.] MP 1946	Water quality measurements at Lake Powell, Utah. Merry
Disinfection of wastewater by microwaves. Iskandar, I.K., et	Engineering systems for wastewater treatment. Loehr, R., et	C.J., (1977, 38p.) SR 77-2i
al, [1980, 15p.] SR 80-01	al, [1983, p.409-417] MP 1948	Chemistry of interstitial water from subsets permafrost
Wastewater treatment in cold regions by overland flow.	Land treatment research and development program. Iskandar, I.K., et al, [1983, 144p.] CR 83-29	Prudhoe Bay, Alaska. Iskandar, I.K., et al, [1978, p.92- 98] MP 138;
Martel, C.J., et al. (1980, 14p.) CR 80-07 EPA policy on land treatment and the Clean Water Act of	Land treatment processes. Merry, C.J., et al, [1983, 79p.]	Guide to the use of 14N and 15N in environmental research
1977. Thomas, R.B., et al, [1980, p.452-460]	SR 63-26	Edwards, A.P., [1978, 77p.] SR 78-10
MP 1418	Utility services for remote military facilities. Reed, S.C., et al, [1984, 66p.]	Blank corrections for ultratrace atomic absorption analysis Cragin, J.H., et al. (1979, 5p.) CR 79-0:
Removal of volatile trace organics from wastewater by over- land flow land treatment. Jenkins, T.F., et al, [1980,	Analysis of infiltration results at a proposed North Carolina	Spray application of wastewater effluent in Vermont. Cas-
p.211-224 ₃ MP 1313	wastewater treatment site. Abele, G., et al, [1984, 24p.]	sell, E.A., et al, [1979, 38p.] SR 79-00
Model for nitrogen behavior in land treatment of wastewater. Selim, H.M., et al, 1980, 49p., CR 80-12	SR 84-11 Nitrogen removal in wastewater ponds. Reed, S.C., [1984,	Mercury contamination of water samples. Cragin, J.H. [1979, p.313-319] MIP 1270
Selim, H.M., et al, [1980, 49p.] CR 80-12 Nitrogen in an overland flow wastewater treatment system.	26p. ₁ CR 84-13	Dissolved nitrogen and oxygen in lake water. Leggett, D.C.
Chen, R.L., et al, [1980, 33p.] SR 80-16	Wetlands for wastewater treatment in cold climates. Reed,	(1979, 5p.) SR 79-24
Aquaculture systems for wastewater treatment: an engineer-	S.C., et al, [1984, 9p. + figs.] MP 1945 Problems with rapid infiltration—a post mortem analysis.	Land treatment of waste water in cold climates. Jenkins T.F., et al. (1979, p.207-214) MP 1279
ing assessment. Reed, S.C., et al, (1980, 127p.) MP 1422	Reed, S.C., et al, [1984, 17p. + figs.] MP 1944	T.F., et al, [1979, p.207-214] MP 1279 Remote sensing of water quality using an airborne spec
Aquaculture systems for wastewater treatment. Reed, S.C.,	Nitrogen behavior in soils irrigated with liquid waste. Selim,	troradiometer. McKim, H.L., et al., [1980, p.1353-1362]
et al, [1980, p.1-12] MIP 1423	H.M., et al, [1984, p.96-108] MIP 1762	MP 149
Forage grass growth on overland flow systems. Palazzo,	Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al, [1984, 36p.]	Overland flow: removal of toxic volatile organics. Jenkins T.F., et al, (1981, 16p.) SR 81-01
A.J., et al, [1980, p.347-354] MP 1402 Removal of consider by overland flow Martel C.L. et al.	CR 84-30	Seven-year performance of CRREL slow-rate land treatmen
Removal of organics by overland flow. Martel, C.J., et al, (1980, 9p.) MP 1362	Maintaining frosty facilities. Reed, S.C., et al, (1985, p.9-	prototypes. Jenkins, T.F., et al, [1981, 25p.]
Energy and costs for agricultural reuse of wastewater. Slet-	15 ₁ MP 1949 Cold weather O&M. Reed, S.C., et al. [1985, p.10-15 ₁	SR 81-12
ten, R.S., et al, [1980, p.339-346] MP 1401	MP 2070	Halocarbons in water using headspace gas chromatography Leggett, D.C., [1981, 13p.] SR 81-24
Spray application of waste-water effluent in a cold climate. Caseell, E.A., et al. (1980, p.620-626) MP 1403	Literature review: effect of freezing on hazardous waste sites.	Limnology of Lake Koocanusa, Montana. Storm, P.C., et al
Rational design of overland flow systems. Martel, C.J., et al.	Iskandar, I.K., et al, [1985, p.122-129] MP 2028	[1982, 597p.] SR 82-2:
[1980, p.114-121] MP 1400	Potential use of artificial ground freezing for contaminant immobilization. Iskandar, I.K., et al., [1985, 10p.]	Water quality measurements at six reservoirs. Parker, L.V. et al. r1982, 55p.; SR 82-36
Soil infiltration on land treatment sites. Abele, G., et al.	MP 2029	et al, [1982, 55p.] SR 82-36 Isothermal compressibility of water mixed with montmorillo
[1980, 41p.] SR 80-36 Overland flow: removal of toxic volatile organics. Jenkins,	Ground freezing for management of hazardous waste sites.	nite. Oliphant, J.L., et al. (1983, p.45-50) MP 296
T.F., et al., [1981, 16p.] SR 81-01	Sullivan, J.M., Jr., et al, [1985, 15p.] MP 2030 Toxic organics removal kinetics in overland flow land treat-	Polyvinyl chloride pipes and ground water chemistry. Park
Toxic volatile organics removal by overland flow land treat-	ment. Jenkins, T.F., et al. [1985, p.707-718]	er, L.V., et al, (1985, 27p.) SR 85-12
ment. Jenkins, T.F., et al., [1981, 14p.] MP 1421	MP 2111	Reversed-phase high-performance liquid chromatographic determination of nitroorganics in munitions wastewater
Aquaculture for wastewater treatment in cold climates. Reed, S.C., et al, 1981, p.482-492; MP 1394	Heat recovery from primary effluent using heat pumps. Phetteplace, G.E., et al. [1985, p.199-203] MP 1978	Jenkins, T.F., et al, [1986, p.170-175] MP 2049
Seasonal growth and accumulation of N, P, and K by grass	Prevention of freezing of wastewater treatment facilities.	Water content
irrigated with wastes. Palazzo, A.J., [1981, p.64-68]	Reed, S.C., et al, (1985, 49p.) SR 85-11	Roof moisture survey: ten State of New Hampshire buildings Tobiasson, W., et al, [1977, 29p.] CR 77-3:
MP 1425 Seven-year performance of CRREL slow-rate land treatment	Reversed-phase high-performance liquid chromatographic	Strength of frozen silt as a function of ice content and dry uni
prototypes. Jenkins, T.F., et al, [1981, 25p.]	determination of nitroorganics in munitions wastewater. Jenkins, T.F., et al, [1986, p.170-175] MP 2049	weight. Sayles, F.H., et al, [1980, p.109-119]
SR \$1-12	Chromatographic determination of nitroorganics in plant	MP 145
Wastewater treatment by a prototype alow rate land treatment system. Jenkins, T.F., et al, [1981, 44p.] CR 81-14	wastewater. Bauer, C.F., et al, (1986, p.176-182) MP 2050	Water erosion Lock wall deicing with high velocity water jet at Soo Locks
Effect of soil temperature on nitrification kinetics. Parker,	Nitrogen removal in cold regions trickling filter systems.	Mi. Calkins, D.J., et al, [1977, p.23-35] MP 97:
L.V., et al, [1981, 27p.] SR 21-33	Reed, S.C., et al, [1986, 39p.] SR 86-02	Weter films
Model for prediction of nitrate leaching losses in soils. Meh-	Wastes	Adsorption force theory of frost heaving. Takagi, S., [1980, p. 57-81.
ran, M., et al, 1981, 24p.; CR 81-23 Vegetation selection and management for overland flow sys-	Effects of wastewater application on forage grasses. Palazzo, A.J., 1976, 8p., CR 76-39	p.57-81 ₁ MP 133- Water flow
tems. Palazzo, A.J., et al., [1982, p.135-154]	A.J., [1976, 8p.] CR 76-39 Land application of wastewater in permafrost areas. Sletten,	Circulation and sediment distribution in Cook Inlet, Alaska
MP 1511	R.S., [1978, p.911-917] MIP 1110	Gatto, L.W., [1976, p.205-227] MP 89:
Overview of models used in land treatment of wastewater. Iskandar, I.K., (1982, 27p.) SR 82-01	Uptake of nutrients by plants irrigated with wastewater.	Bffects of radiation penetration on snowmelt runoff hydrographs. Colbeck, S.C., [1976, p.73-82] MP 94
Nutrient film technique for wastewater treetment. Bouzoun,	Clapp, C.B., et al, r1978, p.395-404; MP 1151 Guide to the use of 14N and 15N in environmental research.	
J.R., et al, [1982, 15p.] SE 82-84	Edwards, A.P., [1978, 77p.] SR 78-18	Water flow through veins in ice. Colbeck, S.C., [1976, 5p.] CR 76-0
Westewater treatment and plant growth. Palazzo, A.J.,	Halocarbons in water using headspace gas chromatography.	Analysis of water flow in dry snow. Colbeck, S.C., [1976,
(1982, 21p.) SR 82-05	Leggett, D.C., (1981, 13p.) SR 81-26	p.523-527 ₁ MP 87

Water flow (cont.)	Potential solution to ice jam flooding: Salmon River, Idaho.	Obtaining fresh water from icebergs. Mellor, M., 1977,
Potential river ice jams at Windsor, Vermont. Calkins, D.J., et al., [1976, 31p.] CR 76-31	Earickson, J., et al, (1986, p.15-25) MP 2131 Water physikase	p.193 ₁ MP 1117 Some elements of iceberg technology. Weeks, W.F., et al,
Computer routing of unsaturated flow through snow. Tuck-	Long distance heat transmission with steam and hot water.	[1978, p.45-98] MP 1616
er, W.B., et al, [1977, 44p.] SR 77-10	Aamot, H.W.C., et al, [1976, 39p.] MP 938	Fresh water supply for an Alaskan village. McFadden, T., et al. (1978, 18p.) SR 78-07
Heat transfer over a vertical melting plate. Yen, YC., et al, [1977, 12p.] CR 77-32	Cold climate utilities delivery design manual. Smith, D.W., et al, [1979, c300 leaves] MP 1373	al, [1978, 18p.] SR 78-67 Water resources by satellite. McKim, H.L., [1978, p.164-
Physical aspec s of water flow through snow. Colbeck, S.C.,	Simplified design procedures for heat transmission system	169 ₃ MP 1090
[1978, p.165-206] MP 1566	piping. Phetteplace, G.E., [1985, p.451-456]	Cold climate utilities delivery design manual. Smith, D.W., et al, [1979, c300 leaves] MP 1373
Entrainment of ice floes into a submerged outlet. Stewart, D.M., et al, [1978, p.291-299] MP 1137	Water pipes	et al, [1979, c300 leaves] MP 1373 Bibliography on techniques of water detection in cold regions.
Study of water drainage from columns of snow. Denoth, A.,	Preeze damage prevention in utility distribution lines.	Smith, D.W., comp, (1979, 75p.) SR 79-10
et al, [1979, 19p.] CR 79-01	McFadden, T., (1977, p.221-231) MP 929	Detection of Arctic water supplies with geophysical techniques. Arcone, S.A., et al. (1979, 30p.) CR 79-15
Point source bubbler systems to suppress ice. Ashton, G.D., [1979, 12p.] CR 79-12	Freeze damage protection for utility lines. McFadden, T., [1977, p.12-16] MP 953	niques. Arcone, S.A., et al., [1979, 30p.] CR 79-15 Case study: fresh water supply for Point Hope, Alaska.
[1979, 12p.] CR 79-12 Water flow through heterogeneous snow. Colbeck, S.C.,	Heat transmission with steam and hot water. Asmot,	McFadden, T., et al. [1979, p.1029-1040] MP 1222
[1979, p.37-45] MP 1219	H.W.C., et al, [1978, p.17-23] MP 1956	Tundra lakes as a source of fresh water: Kipnuk, Alaska. Bredthauer, S.R., et al, [1979, 16p.] SR 79-30
Water movement in a land treatment system of wastewater by	Modeling intake peformance under frazil ice conditions. Dean, A.M., Jr., [1984, p.559-563] MP 1797	looberg water: an assessment. Weeks, W.F., 1980, p.5-
overland flow. Nakano, Y., et al, [1979, p.185-206] MP 1285	Weter polinties	10 ₁ MP 1365
Remote sensing of water circulation in Grays Harbor, Wash-	Baseline data on tidal flushing in Cook Inlet, Alaska. Gatto,	Developing a water well for the ice backfilling of DYE-2. Rand, J.H., [1982, 19p.] SR 82-32
ington. Gatto, L.W., [1980, p.289-323] MP 1283 Traveling wave solutions of saturated-unsaturated flow	L.W., [1973, 11p.] MP 1523 Land treatment of wastewaters for rural communities. Reed,	Water supply and waste disposal on permanent snow fields.
through porous media. Nakano, Y., [1980, p.117-122]	S.C., et al, [1975, p.23-39] MIP 1399	Reed, S.C., et al, [1984, p.401-413] MP 1714
MP 1278	Land treatment in relation to waste water disposal. Howells,	Utility services for remote military facilities. Reed, S.C., et al, [1984, 66p.] SR 84-14
Water and air horizontal flow in porous media. Nakano, Y., [1980, p.81-85] MP 1341	D.H., et al, [1976, p.60-62] MP 869 Effect of open water disposal of dredged sediments. Blom,	Water supply and waste disposal in Greenland and Antarc-
Water and air vertical flow through porous media. Nakano,	B.E., et al, (1976, 183p.) MP 967	tica. Reed, S.C., et al, [1985, p.344-350] MP 1792
Y., [1980, p.124-133] MP 1342	Thermal pollution studies of French Creek, Bielson AFB,	Water table Periodic structure of New Hampshire silt in open-system
Inlet current measured with Seasat-1 synthetic aperture radar. Shemdin, O.H., et al, [1980, p.35-37] MP 1443	Alaska. McFadden, T., [1976, 5p.] CR 76-14 Land treatment of wastewater at a subarctic Alaskan location.	freezing. McGaw, R., [1977, p.129-136] MP 902
Traveling wave solution to the problem of simultaneous flow	Sletten, R.S., et al, [1976, 21p.] MP 868	Application of recent results in functional analysis to the problem of water tables. Nakano, Y., [1979, p.185-190]
of water and air through homogeneous porous media. Nakano, Y., [1981, p.57-64] MP 1419	Land treatment of wastewater in subarctic Alaska. Sletten,	MP 1369
Linearized Boussinesq groundwater flow equation. Daly,	R.S., et al, [1977, p.533-547] MP 1268 Health aspects of water reuse in California. Reed, S.C.,	Water and air vertical flow through porous media. Nakano,
C.J., et al, (1981, p.875-884) MP 1470	(1979, p.434-435) MP 1404	Y., (1980, p.124-133) MP 1342 Radar profiling of buried reflectors and the groundwater table.
Asymmetric flows: application to flow below ice jams. Gögüs, M., et al, [1981, p.342-350] MP 1733	Atmospheric pollutants in snow cover runoff. Colbeck, S.C.,	Sellmann, P.V., et al, [1983, 16p.] CR 83-11
Tests of frazil collector lines to assist ice cover formation.	[1981, p.1383-1388] MP 1487 Limnology of Lake Koocanusa, MT, the 1967-1972 study.	Water temperature
Perham, R.B., [1981, p.442-448] MP 1488	Bonde, T.J.H., et al, [1982, 184p.] SR 82-21	Temperature and flow conditions during the formation of river ice. Ashton, G.D., et al, [1970, 12p.]
Model for prediction of nitrate leaching losses in soils. Mehran, M., et al, [1981, 24p.] CR 81-23	Energy conservation and water pollution control facilities.	MIP 1723
Model study of Port Huron ice control structure; wind stress	Martel, C.J., et al, [1982, 18p.] SR 82-24 Limnology of Lake Koocanusa, Montana. Storm, P.C., et al,	Radiation and evaporation heat loss during ice fog conditions. McFadden, T., r1975, p.18-27; MP 1851
simulation. Sodhi, D.S., et al, [1982, 27p.]	[1982, 597p.] SR 82-23	Compressive and shear strengths of fragmented ice covers.
Freezing and blocking of water pipes. Carey, K.L., (1982,	Water quality measurements at six reservoirs. Parker, L.V., et al., 1982, 55p.; SR 82-30	Cheng, S.T., et al, [1977, 82p.] MP 951
11p. ₁ TD 82-01	Nitrogen removal in wastewater stabilization ponds. Reed,	Heat transmission with steam and hot water. Aamot, H.W.C., et al, [1978, p.17-23] MP 1956
Theory of thermal control and prevention of ice in rivers and lakes. Ashton, G.D., [1982, p.131-185] MP 1554	S.C., [1983, 13p. + fign.] MP 1943	Break-up of the Yukon River at the Haul Road Bridge: 1979.
Application of HEC-2 for ice-covered waterways. Calkins,	Impact of dredging on water quality at Kewaunee Harbor, Wisconsin. Iskandar, I.K., et al, [1984, 16p.]	Stephens, C.A., et al, [1979, 22p. + Figs.] MP 1315
D.J., et al, [1982, p.241-248] MP 1575	CR 84-21	Winter thermal structure, ice conditions and climate of Lake Champlain. Bates, R.E., [1980, 26p.] CR 88-02
Evaluation of procedures for determining selected aquifer parameters. Daly, C.J., [1982, 104p.] CR 82-41	Chemical analysis of munitions wastewater. Jenkins, T.F., et	Free convection heat transfer characteristics in a melt water
Tailwater flow conditions. Ferrick, M.G., et al, [1983,	al, [1984, 95p.] CR 84-29 Toxic organics removal kinetics in overland flow land treat-	layer. Yen, YC., [1980, p.550-556] MP 1311
31p.j CR 83-07	ment. Jenkina, T.F., et al, [1985, p.707-718]	Bottom heat transfer to water bodies in winter. O'Neill, K., et al, (1981, 8p.) SR 81-18
Asymmetric plane flow with application to ice jams. Tatinclaux, J.C., et al, [1983, p.1540-1556] MP 1645	MP 2111	River ice suppression by side channel discharge of warm wa-
Boundary value problem of flow in porous media. Nakano,	Polyvinyl chloride pipes and ground water chemistry. Parker, L.V., et al, [1985, 27p.] SR 85-12	ter. Ashton, G.D., (1982, p.65-80) MP 1528 Porecasting water temperature decline and freeze-up in rivers.
Y., (1983, p.205-213) MP 1721	Chromatographic determination of nitroorganics in plant	Shen, H.T., et al, [1984, 17p.] CR 84-19
Procedure for calculating groundwater flow lines. Daly, C.J., §R 84-09	wastewater. Bauer, C.F., et al, [1986, p.176-182] MP 2050	USACRREL precise thermistor meter. Trachier, G.M., et
Diffusivity of horizontal water flow through porous media.	Water pressure	al, [1985, 34p.] SR 85-26 Heat transfer in water flowing over a horizontal ice aheet.
Nakano, Y., [1985, p.26-31] MP 1881 Experimental measurement of channeling of flow in porous	Water flow through veins in ice. Colbeck, S.C., [1976, 5p.]	Lunardini, V.J., et al, [1986, 81p.; CR 86-03
media. Oliphant, J.L., et al, [1985, p.394-399]	On the use of tensiometers in anow hydrology. Colbeck,	Bubblers and pumps for melting ice. Ashton, G.D., 1986, p.223-234; MP 2133
MP 1967	S.C., (1976, p.135-140) MP 843	p.223-234 ₁ MP 2133 Water transport
Heat transfer in water over a melting ice sheet. Lunardini, V.J., [1986, p.227-236] MP 2033	Model study of Port Huron ice control structure; wind stress	Mechanisms of crack growth in quartz. Martin, R.J., III, et
Heat transfer in water flowing over a horizontal ice sheet.	simulation. Sodhi, D.S., et al, [1982, 27p.]	al, (1975, p.4837-4844) MP 835 Effects of ice on the water transport in frozen soil. Nakano,
Lunardini, V.J., et al, [1986, 81p.] CR 86-03 Laboratory study of flow in an ice-covered sand bed channel.	Investigation of transient processes in an advancing zone of	Y., et al, [1983, p.15-26] MP 1601
Wuebben, J.L., [1986, p.3-14] MP 2123	freezing. McGaw, R., et al, [1983, p.821-825] MP 1663	Soil-water diffusivity of unsaturated frozen soils at subzero
Water intakes	Field tests of a frost-heave model. Guymon, G.L., et al,	temperatures. Nakano, Y., et al, [1983, p.889-893] MP 1664
Entrainment of ice floes into a submerged outlet. Stewart, D.M., et al, [1978, p.291-299] MP 1137	[1983, p.409-414] MP 1657	Effects of ice content on the transport of water in frozen soils.
Ice blockage of water intakes. Carey, K.L., [1979, 27p.]	Water reserves Remote sensing data for water masses in Delaware Bay and	Nakano, Y., et al. (1984, p.28-34) MP 1841 Role of heat and water transport in frost heaving of porous
MP 1197	adjacent wetlands. Ackleson, S.G., et al, [1985, p.1123-	soils. Nakano, Y., et al, [1984, p.93-102] MP 1842
Inlet current measured with Seasat-1 synthetic aperture radar. Shemdin, O.H., et al. [1980, p.35-37] MP 1443	1129; MP 1909 Water retention	Effects of ice content on the transport of water in frozen soil.
Inlet current measured with Seasat-1 synthetic aperture radar.	Analysis of water flow in dry snow. Colbeck, S.C., (1976,	Nakano, Y., et al, [1984, p.58-66] MP 1843 Transport of water in frozen soil. Nakano, Y., et al, [1984,
Shemdin, O.H., et al, [1980, p.35-37] MP 1481 Hydraulic model study of a water intake under frazil ice con-	p.523-527 ₁ NEP 871	p.172-179 ₃ MP 1819
ditions. Tantillo, T.J., (1981, 11p.) CR 81-03	Soil hydraulic conductivity and moisture retention features. Ingersoil, J., [1981, 11p.] SR 81-02	Weter treatment Land disposal: state of the art. Reed, S.C., [1973, p.229-
Lake water intakes under icing conditions. Dean, A.M., Jr.,	Laboratory and field use of soil tensiometers above and below	261 ₁ MP 1392
[1983, 7p.] CR 83-15 Modeling intake peformance under frazil ice conditions.	0 deg C. Ingersoll, J., [1981, 17p.] SR 81-07	Wastewater reuse at Livermore, California. Uiga, A., et al,
Dean, A.M., Jr., [1984, p.559-563] MP 1797	Design and performance of water-retaining embankments in permafrost. Sayles, F.H., (1984, p.31-42) MP 1850	[1976, p.511-531] MP 876 Land treatment of wastewater. Murrmann, R.P., et al.
Water level		[1976, 36p.] MP 920
Clearing ice-clogged shipping channels. Vance, G.P., [1980, 13p.] CR 80-28	Towing icebergs. Lonadale, H.K., et al, [1974, p.2] MP 1020	Reclamation of wastewater by application on land. lakandar, I.K., et al, (1976, 15p.) MP 896
Breakup of solid ice covers due to rapid water level variations.	Snow accumulation for arctic freshwater supplies. Slaughter,	
Billfalk, L., (1982, 17p.) CR 82-03 Field tests of a frost-heave model. Guymon, G.L., et al,	C.W., et al, [1975, p.218-224] MP 860	Wastewater renovation by a prototype alow infiltration land treatment system. Iakandar, I.K., et al, [1976, 44p.] CR 76-19
[1983, p.409-414] MP 1657	Computer simulation of the snowmelt and soil thermal regime at Barrow, Alaska. Outcalt, S.I., et al., [1975, p.709-715]	Wastewater treatment in cold regions. Sletten, R.S., et al.
Wetlands for wastewater treatment in cold climates. Reed,	MP \$57	[1976, 15p.] MP 965
S.C., et al, (1984, 9p. + figs.) MP 1945 Effect of ice cover on hydropower production. Yapa, P.D.,	Utility distribution systems in Sweden, Finland, Norway and England. Aamot, H.W.C., et al. (1976, 121p.)	Overview of land treatment from case studies of existing sys- tems. Uiga, A., et al, [1976, 26p.] MP 591
et al, (1984, p.231-234; MP 1876	SR 76-16	Rapid infiltration of primary sewage effluent at Fort Devena.
Uplifting forces exerted by adfrozen ice on marine piles. Christensen, F.T., et al, [1985, p.529-542] MP 1905	Field performance of a subarctic utilidor. Reed, S.C., [1977, p.448-468] MIP 930	Massachusetts. Satterwhite, M.B., et al. [1976, 34p.] CR 76-48

Management of malassas assess and the contract of the contract		
Treatment of primary sewage effluent by rapid infiltration. Satterwhite, M.B., et al, [1976, 15p.] CR 76-49	Disinfection of wastewater by microwaves. Iskandar, I.K., et	Model for land treatment planning, design and operation,
Wastewater reuse at Livermore, California. Uiga, A., et al,	al, [1980, 15p.] SR 80-01	Pt.2. Baron, J.A., et al, [1983, 30p.] SR 83-07
(1977, p.511-531) MP 979	Wastewater treatment in cold regions by overland flow. Martel, C.J., et al. [1980, 14p.] CR 89-07	Model for land treatment, Pt.1. Baron, J.A., et al., [1983, 35p.] SR 83-06
Determination of TNT in water by conversion to nitrate.	EPA policy on land treatment and the Clean Water Act of	Nitrogen removal in wastewater stabilization ponds. Reed,
Leggett, D.C., [1977, p.880] MP 980	1977. Thomas, R.E., et al. (1980, p.452-460)	S.C., [1983, 13p. + figs.] MP 1943
Wastewater treatment at Calumet, Michigan. Baillod, C.R.,	MP 1418	Wastewater treatment and reuse process for cold regions.
et al, [1977, p.489-510] MP 976	Removal of volatile trace organics from wastewater by over-	Bouzoun, J.R., [1983, p.547-557] MP 2112
Land treatment of wastewater at Manteca, Calif., and Quincy,	land flow land treatment. Jenkins, T.F., et al, [1980,	Engineering systems for wastewater treatment. Lochr, R., et
Washington. Iskandar, I.K., et al, [1977, 34p.]	p.211-224 ₁ MP 1313	al, [1983, p.409-417] MP 1948
CR 77-24	Nitrogen in an overland flow wastewater treatment system.	Land application systems for wastewater treatment. Reed,
Municipal sludge management: environmental factors.	Chen, R.L., et al. [1980, 33p.] SR 86-16	S.C., [1983, 26p. + figs.] MP 1946
Reed, S.C., ed, [1977, Var. p.] MP 1406	Model for nitrogen behavior in land treatment of wastewater.	Land treatment research and development program. Iskan-
Land treatment of wastewater at West Dover, Vermont.	Selim, H.M., et al, [1980, 49p.] CR 80-12	dar, I.K., et al, [1983, 144p.] CR 83-20
Bouzoun, J.R., (1977, 24p.) SR 77-33	Aquaculture systems for wastewater treatment: an engineer-	Land treatment processes. Merry, C.J., et al, [1983, 79p.]
Wastewater treatment alternative needed. Iskandar, I.K., et al., [1977, p.82-87] MP 968	Aquaculture systems for wastewater treatment: an engineering assessment. Reed, S.C., et al., [1980, 127p.] MP 1422	SR 83-26
	Aquaculture systems for wastewater treatment. Reed, S.C.,	Water supply and waste disposal on permanent snow fields.
Land treatment module of the CAPDET program. Merry, C.J., et al, [1977, 4p.] MP 1112	et al, [1980, p.1-12] MP 1423	Reed, S.C., et al, [1984, p.401-413] MP 1714
Land application of wastewater in permafrost areas. Sletten,	Dynamics of NH4 and NO3 in cropped soils irrigated with	Analysis of infiltration results at a proposed North Carolina
R.S., [1978, p.911-917] MP 1110	wastewater. Iskandar, I.K., et al, [1980, 20p.]	wastewater treatment site. Abele, G., et al, [1984, 24p.] SR 84-11
Lysimeters validate wastewater renovation models. Iskan-	SR \$0-27	Utility services for remote military facilities. Reed, S.C., et
dar, I.K., et al, [1978, 11p.] SR 78-12	Forage grass growth on overland flow systems. Palazzo,	al, [1984, 66p.] SR 84-14
Land treatment: present status, future prospects. Pound,	A.J., et al, [1980, p.347-354] MP 1402	Nitrogen removal in wastewater ponds. Reed, S.C., [1984,
C.E., et al, [1978, p.98-102] MP 1417	Rational design of overland flow systems. Martel, C.J., et al,	26p. ₁ CR 84-13
Microbiological aerosols during wastewater irrigation. Bau-	[1980, p.114-121] MP 1400	Wetlands for wastewater treatment in cold climates. Reed,
sum, H.T., et al, [1978, p.273-280] MP 1154	Removal of organics by overland flow. Martel, C.J., et al,	S.C., et al, [1984, 9p. + figs.] MP 1945
Performance of overland flow land treatment in cold climates.	[1980, 9p.] MP 1362	Problems with rapid infiltration—a post mortem analysis.
Jenkina, T.F., et al, [1978, p.61-70] MP 1152	Energy and costs for agricultural reuse of wastewater. Slet-	Reed, S.C., et al., [1984, 17p. + figs.] MP 1944
Symposium on land treatment of wastewater, CRREL, Aug.	ten, R.S., et al, [1980, p.339-346] MP 1401	Nitrogen behavior in soils irrigated with liquid waste. Selim,
1978. (1978, 2 vols.) MP 1145	Spray application of waste-water effluent in a cold climate.	H.M., et al. [1984, p.96-108] MP 1762
Overview of existing land treatment systems. Iskandar, I.K., [1978, p.193-200] MP 1150	Cassell, E.A., et al, [1980, p.620-626] MP 1403	Impact of slow-rate land treatment on groundwater quality: toxic organics. Parker, L.V., et al, [1984, 36p.]
	Effectiveness of land application for P removal from waste water. Iskandar, I.K., et al., [1980, p.616-621]	CR 84-30
Nitrogen behavior in land treatment of wastewater: a simpli- fied model. Selim, H.M., et al, [1978, p.171-179]	Water. Incliniar, 1.K., et al, [1980, p.010-021] MP 1444	Maintaining frosty facilities. Reed, S.C., et al, [1985, p.9-
MP 1149	Toxic volatile organics removal by overland flow land treat-	15 ₁ MP 1949
NO3-N in percolate water in land treatment. Iskandar, I.K.,	ment. Jenkins, T.F., et al, [1981, 14p.] MP 1421	Cold weather O&M. Reed, S.C., et al, [1985, p.10-15]
et al, [1978, p.163-169] MP 1148	Overland flow: removal of toxic volatile organics. Jenkins,	MP 2070
Computer procedure for comparing wastewater treatment	T.F., et al, [1981, 16p.] SR 81-01	Toxic organics removal kinetics in overland flow land treat-
systems. Spaine, P.A., et al, [1978, p.335-340]	Seasonal growth and accumulation of N, P, and K by grass	ment. Jenkins, T.F., et al, [1985, p.707-718]
MP 1155	irrigated with wastes. Palazzo, A.J., [1981, p.64-68]	MP 2111
Uptake of nutrients by plants irrigated with wastewater.	MP 1425	Prevention of freezing of wastewater treatment facilities.
Clapp, C.E., et al. [1978, p.395-404] MP 1151	Aquaculture for wastewater treatment in cold climates.	Reed, S.C., et al, [1985, 49p.] SR 85-11
Remote sensing for land treatment site selection. Merry,	Reed, S.C., et al, [1981, p.482-492] MP 1394	Heat recovery from primary effluent using heat pumps.
C.J., [1978, p.107-119] MP 1146	Hydraulic characteristics of the Deer Creek Lake land treat-	Phetteplace, G.E., et al. [1985, p.199-203] MP 1978
Waste water reuse in cold regions. Iskandar, I.K., 1978,	ment site during wastewater application. Abele, G., et al. [1981, 37p.] CR 81-07	Chromatographic determination of nitroorganics in plant wastewater. Bauer, C.F., et al., [1986, p.176-182]
p.361-368 ₁ MP 1144	Seasonal growth and uptake of nutrients by orchardgrass irri-	MP 2050
Mass water balance during spray irrigation with wastewater at Deer Creek Lake land treatment site. Abele, G., et al,	gated with wastewater. Palazzo, A.J., et al, [1981, 19p.]	Reversed-phase high-performance liquid chromatographic
(1978, 43p.) SR 79-29	CR 81-08	determination of nitroorganics in munitions wastewater.
Computer file for existing land application of wastewater sys-	Seven-year performance of CRREL alow-rate land treatment	Jenkins, T.F., et al, [1986, p.170-175] MIP 2049
tems. Iskandar, I.K., et al, [1978, 24p.] SR 78-22	prototypes. Jenkins, T.F., et al, [1981, 25p.]	Nitrogen removal in cold regions trickling filter systems.
Wastewater stabilization pond linings. Middlebrooks, B.J.,	SR 81-12	Reed, S.C., et al, [1986, 39p.] SR 86-02
et al, [1978, 116p.] SR 78-28	Wastewater treatment by a prototype slow rate land treatment	Water vapor
Experimental system for land renovation of effluent. Ny-	system. Jenkins, T.F., et al, [1981, 44p.] CR 81-14	Water vapor adsorption by sodium montmorillonite at -5C.
lund, J.R., et al, [1978, 26p.] SR 78-23	Site selection methodology for the land treatment of wastewa-	Anderson, D.M., et al, [1978, p.638-644] MP 981
Land treatment climatic survey at CRREL. Bilello, M.A., et	ter. Ryan, J.R., et al, [1981, 74p.] SR 81-28	Analysis of water in the Martian regolith. Anderson, D.M.,
al, [1978, 37p.] SR 78-21	Vegetation selection and management for overland flow sys-	et al, [1979, p.33-38] MP 1409
Five-year performance of CRREL land treatment test cells.	tems. Palazzo, A.J., et al, [1982, p.135-154] MIP 1511	Thermal convection in anow. Powers, D.J., et al, [1985, 61p.] CR 85-69
Jenkina, T.F., et al., [1978, 24p.] SR 78-26	Overview of models used in land treatment of wastewater.	Vapor drive maps of the U.S.A. Tobiasson, W., et al, (1986,
Cold climate utilities delivery design manual. Smith, D.W., et al, [1979, c300 leaves] MP 1373	Iskandar, I.K., [1982, 27p.] SR 82-01	7p. + graphs ₁ MP 2041
Kinetics of denitrification in land treatment of wastewater.	Nutrient film technique for wastewater treatment. Bouzoun,	Water waves
Jacobson, S., et al, [1979, 59p.] SR 79-04	J.R., et al, [1982, 15p.] SR 82-04	Breakup of solid ice covers due to rapid water level variations.
Spray application of wastewater effluent in Vermont. Cas-	Overland flow: an alternative for wastewater treatment.	Billfalk, L., [1982, 17p.] CR 82-03
sell, E.A., et al, [1979, 38p.] SR 79-06	Martel, C.J., et al, [1982, p.181-184] MP 1506	On zero-inertia and kinematic waves. Katopodes, N.D.,
Health aspects of water reuse in California. Reed, S.C.,	Wastewater treatment and plant growth. Palazzo, A.J.,	(1982, p.1381-1387) MP 2053
[1979, p.434-435] MP 1404	[1982, 21p.] SR 82-05	Tailwater flow conditions. Ferrick, M.G., et al, 1983,
Nitrification inhibitor in land treatment of wastewater in cold	Heat pumps to recover heat from waste treatment plants.	31p. ₃ CR 83-07
regions. Elgawhary, S.M., et al, [1979, 25p.]	Martel, C.J., et al, [1982, 23p.] SR 82-10 Premoval during land treatment of preserved as Pudes I.C.	Analysis of rapidly varying flow in ice-covered rivers. Ferrick, M.G., r1984, p.359-3681 MP 1833
SR 79-18	P removal during land treatment of wastewater. Ryden, J.C., et al, [1982, 12p.] SR 82-14	rick, M.G., [1984, p.359-368] MP 1833 Shoreline erosion processes: Orwell Lake, Minnesota. Reid,
Freezing problems with wintertime wastewater spray irriga- tion. Bouzoun, J.R., [1979, 12p.] SR 79-12	Land treatment of wastewater. Reed, S.C., [1982, p.91-	J.R., [1984, 101p.] CR 84-32
Design of liquid-waste land application. lakandar, I.K.,	123 ₁ MP 1947	Analysis of river wave types. Ferrick, M.G., [1985, 17p.]
[1979, p.65-88] MP 1415	Wastewater treatment in Alaska. Schneiter, R.W., et al,	CR 85-12
Land treatment systems and the environment. McKim,	(1982, p.207-213) MP 1696	Waterproofing
H.L., et al, [1979, p.201-225] MP 1414	Heating enclosed wastewater treatment facilities with heat	Protected membrane roofs in cold regions. Aamot, H.W.C.,
Cost-effective use of municipal wastewater treatment ponds.	pumps. Martel, C.J., et al, [1982, 20p.] MIP 1976	et al, [1976, 27p.] CIR 76-02
Reed, S.C., et al, [1979, p.177-200] MP 1413	Wastewater applications in forest ecosystems. McKim,	Water absorption of insulation in protected membrane roofing
Water movement in a land treatment system of wastewater by	H.L., et al, [1982, 22p.] CR 82-19	systems. Schaefer, D., {1976, 15p.} CR 76-38
overland flow. Nakano, Y., et al, (1979, p.185-206)	Direct filtration of streamborne glacial silt. Ross, M.D., et	Enclosing fine-grained soils in plastic moisture barriers.
MP 1285	al, [1982, 17p.] CR 82-23	Smith, N., [1978, p.560-570] MP 1089
International and national developments in land treatment of	User's index to CRREL land treatment computer programs	Load tests on membrane-enveloped road sections. Smith, N., et al, [1978, 16p.] CR 78-12
wastewater. McKim, H.L., et al, [1979, 28p.] MP 1420	and data files. Berggren, P.A., et al, [1982, 65p.] SR 82-26	N., et al, [1978, 16p.] CR 78-12 Waterproofing strain gages for low ambient temperatures.
Soil characteristics and climatology during wastewater ap-	Energy conservation and water pollution control facilities.	Garfield, D.E., et al., [1978, 20p.] SR 78-15
plication at CRREL. Iskandar, I.K., et al, [1979, 82p.]	Martel, C.J., et al. [1982, 18p.] SR 82-24	Construction and performance of membrane encapsulated
SR 79-23	Wastewater treatment by nutrient film technique. Bouzoun,	soil layers in Alaska. Smith, N., [1979, 27p.]
Health aspects of land treatment. Reed, S.C., [1979, 43p.]	J.R., et al, [1982, 34p.] SR 82-27	CR 79-16
MP 1389	Case study of land treatment in a cold climate—West Dover,	Roofs in cold regions. Tobissson, W., (1980, 21p.)
Cost of land treatment systems. Reed, S.C., et al, (1979,	Vermont. Bouzoun, J.R., et al, [1982, 96p.]	MP 1408
135p.; MP 1387	CR 82-44	Roof moisture surveys. Tobiasson, W., et al., [1981, 18p.]
Bacterial aerosols resulting from wastewater irrigation in Ohio. Bausum, H.T., et al, [1979, 64p.] SR 79-32	Assessment of the treatability of toxic organics by overland	Roof moisture surveys. Tobiasson, W., [1982, p.163-166]
Nitrogen transformations in land treatment. Jenkins, T.F.,		ALEX MODERNITE SULVEYS. LODIABBOOD. W (1987 & 163-166)
	flow. Jenkins, T.F., et al, [1983, 47p.] CR 83-03	APD 18AR
et al. (1979, 32p.) SP 79.31	Microbiological aerosols from waste water. Bausum, H.T., et	MP 1505
et al, [1979, 32p.] SR 79-31 Prototype wastewater land treatment system. Jenkins, T.F.,	Microbiological aerosols from waste water. Bausum, H.T., et al, [1983, p.65-75] MP 1878	Watersheds
et al. (1979, 32p.) Prototype wastewater land treatment system. et al. (1979, 91p.) SR 79-31 Jenkins, T.F., SR 79-35	Microbiological aerosols from waste water. Bausum, H.T., et	Watersheds High-latitude basins as settings for circumpolar environmen-
Prototype wastewater land treatment system. Jenkins, T.F., et al., [1979, 91p.] SR 79-35 Enzyme kinetic model for nitrification in soil amended with	Microbiological aerosols from waste water. Bausum, H.T., et al., (1983, p.65-75) MP 1578 Corps of Engineers land treatment of wastewater research	Watersheds
Prototype wastewater land treatment system. Jenkins, T.F., et al, [1979, 91p.] SR 79-35	Microbiological acrosols from waste water. Bausum, H.T., et al., [1983, p.65-75] Corps of Engineers land treatment of wastewater research program: an annotated bibliography. Parker, L.V., et al.,	Watersheds High-latitude basins as settings for circumpolar environmental studies. Slaughter, C.W., et al., 1975, p.IV/57-

Watershills (see 4.)	987	6
Watersheds (cont.) Drainage network of a subarctic watershed. Bredthauer	Weather medification Use of compressed air for supercooled fog dispersal. Wein-	Some simple concepts on wind forcing over the marginal ico zone. Tucker, W.B., [1984, p.43-48] MP 1783
S.R., et al, [1979, 9p.] SR 79-19	stein, A.I., et al, [1976, p.1226-1231] MP 1614	Wind tunnels
Drainage network analysis of a subarctic watershed. Bred thauer, S.R., et al, [1979, p.349-359] MP 1274		Ice accretion under natural and laboratory conditions. Itaga- ki, K., et al, [1985, p.225-228] MP 2009
Watershed medeling in cold regions. Stokely, J.L., [1980,	scope. Kumai, M., et al, [1976, p.249-252] MP 931	Wind velocity
241p. ₁ MP 1471		Snow loads on structures. O'Rourke, M.J., [1978, p.418-
Hydrology and climatology of a drainage basin near Fair banks, Alaska. Haugen, R.K., et al, [1982, 34p.]	Kumai, M., et al, [1978, p.106-112] MP 1386 Weatherproofing	428 ₁ MP 1801 Ice arching and the drift of pack ice through channels. Sod-
CR 82-20	Window performance in extreme cold. Flanders, S.N., et al,	hi, D.S., et al, [1978, p.415-432] MP 1134
Runoff from a small subarctic watershed, Alaska. Chache E.F., et al, [1983, p.115-120] MP 1654		Surface meteorology US/USSR Weddell Polynya Expedition 1981. Andreas, E.L., et al, [1983, 32p.] SR 83-14
Wave propagation	Window performance in extreme cold. Flanders, S.N., et al, [1982, 21p.] CR 82-38	Role of plastic ice interaction in marginal ice zone dynamics
Surface-wave dispersion in Byrd Land. Acharya, H.K.	Weddell Sea	Leppitranta, M., et al, [1985, p.11,899-11,909] MP 1544
[1972, p.955-959] MP 992 Blectrical ground impedance measurements in Alaskan per		Windows
mafrost regions. Hockstra, P., [1975, 60p.]	MP 1014	Infrared thermography of buildings. Munis, R.H., et al.
MP 1049	Times processing in our low or me women regions Times	[1977, 17p.] SR 77-29 Infrared thermography of buildings: 1977 Coast Guard sur-
Analysis of explosively generated ground motions using Fourier techniques. Blouin, S.E., et al, [1976, 86p.]	ley, S.F., et al. [1978, 17p.] CR 78-19 Sea ice and ice algae relationships in the Weddell Sea. Ack-	vey. Marshall, S.J., (1979, 40p.) SR 79-20
CD2 76-24	ley, S.F., et al, [1978, p.70-71] MP 1203	Window performance in extreme cold. Planders, S.N., et al. [1981, p.396-408] MP 1393
Ground pressures exerted by underground explosions. John son, P.R., [1978, p.284-290] MP 1520		Window performance in extreme cold. Flanders, S.N., et al.
Interaction of a surface wave with a dielectric slab discon	Mass-balance aspects of Weddell Sea pack-ice. Ackley, S.F.,	[1982, 21p.] CR 82-31
tinuity. Arcone, S.A., et al., [1978, 10p.] CR 78-00 Hydraulic transients: a seismic source in volcanoes and gla		Winter concreting Cements for structural concrete in cold regions. Johnson, R.
ciera. St. Lawrence, W.F., et al, [1979, p.654-656]	Continuum sea ice model for a global climate model. Ling, C.H., et al, [1980, p.187-196] MP 1622	[1977, 13p.] SR 77-35
MP 1181	Sea ice studies in the Weddell Sea aboard USCGC Polar Sea.	Regulated set concrete for cold weather construction. Sayles, F.H., et al, [1980, p.291-314] MP 1359
Ultrasonic investigation on ice cores from Antarctica Kohnen, H., et al, [1979, 16p.] CR 79-16		Cold weather construction materials; Part 2-Regulated-set
Ultrasonic investigation on ice cores from Antarctica	drifting buoys. Ackley, S.F., [1981, p.177-191]	cement for cold weather concreting, field validation of
Kohnen, H., et al, [1979, p.4865-4874] MP 1239	MP 1427	cement for cold weather concreting, field validation of laboratory tests. Houston, B.J., et al, [1981, 33p.] MP 1464
Analysis of plastic shock waves in snow. Brown, R.L. [1979, 14p.] CR 79-29	Atmospheric boundary layer measurements in the Weddell Sea. Andreas, E.L., [1982, p.113-115] MP 1610	Brittleness of reinforced concrete structures under arctic con-
Traveling wave solutions of saturated-unsaturated flow	Physical, chemical and biological properties of winter sea ice	ditions. Kiveksa, L., et al, [1985, 28 + 14p.] MP 1969
through porous media. Nakano, Y., [1980, p.117-122] MP 127	in the Weddell Sea. Clarke, D.E., et al. (1982, p.107- 109) MP 1609	Winter maintenance
Low frequency surface impedance measurements. Arcone	Observations of pack ice properties in the Weddell Sea.	Winter maintenance research needs. Minak, L.D., 11975, p.36-38 ₁ MP 950
S.A., et al, [1980, p.1-9] MP 1280		p.36-38 ₁ MP 950 Road construction and maintenance problems in central Alas-
Dynamic testing of free field stress gages in frozen soil. Aitk en, G.W., et al, [1980, 26p.] SR 80-36		ka. Clark, E.F., et al. [1976, 36p.] SR 76-06
Analysis of non-steady plastic shock waves in snow. Brown	Morphology and ecology of diatoms in sea ice from the Wed-	Snow removal equipment. Minsk, L.D., [1981, p.648-670] MP 1446
R.L., [1980, p.279-287] MP 1354	dell Sea. Clarke, D.B., et al, [1984, 41p.] CR 84-05 Wedges	Snow and ice control on railroads, highways and airports.
Propagation of stress waves in alpine snow. Brown, R.L. [1980, p.235-243] MP 136		Minak, L.D., et al, [1981, p.671-706] MIP 1447
Traveling wave solution to the problem of simultaneous flow	[1977, 26p.] CR 77-26	Engineer's pothole repair guide. Eaton, R.A., et al, [1984, 12p.] TD 84-01
of water and air through homogeneous porous media Nakano, Y., [1981, p.57-64] MP 1419	Wells Developing a water well for the ice backfilling of DYE-2.	Strategies for winter maintenance of pavements and road-
Distortion of model subsurface radar pulses in complex die		ways. Minsk, L.D., et al, [1984, p.155-167] MP 1964
lectrics. Arcone, S.A., [1981, p.855-864] MP 1472	***************************************	Wooden structures
On zero-inertia and kinematic waves. Katopodes, N.D. (1982, p.1381-1387) MP 205:	Thermodynamic deformation of wet snow. Colbeck, S.C., [1976, 9p.] CR 76-44	Air-transportable Arctic wooden shelters. Flanders, S.N., et al, [1982, p.385-397] MP 1558
Review of the propagation of inelastic pressure waves in snow	Compression of wet snow. Colbeck, S.C., et al, [1978,	al, [1982, p.385-397] MP 1556 X ray analysis
Albert, D.G., [1983, 26p.] CR 83-13 SNOW-ONE-B data report. Bates, R.E., ed, [1983,		Elemental analyses of ice crystal nuclei and aerosols.
284p. ₁ SR 83-16	Regelation and the deformation of wet snow. Colbeck, S.C., et al, [1978, p.639-650] MP 1172	Kumai, M., [1977, 5p.] MP 1191 X-ray measurement of charge density in ice. Itagaki, K.,
Optical engineering for cold environments. Aitken, G.W.	Physical aspects of water flow through snow. Colbeck, S.C.,	[1978, 12p.] CR 79-25
ed, [1983, 225p.] MP 1640 Comparative near-millimeter wave propagation properties o		X ray diffraction
snow or rain. Nemarich, J., et al, [1983, p.115-129]	snow. Colbeck, S.C., [1978, p.189-201] MP 1124	Effect of X-ray irradiation on internal friction and dielectric relaxation of ice. Itagaki, K., et al, (1983, p.4314-4317)
MP 1690 Radar wave speeds in polar glaciers. Jezek, K.C., et al	Completion of wer show on inginasys. Conocci, s.c.,	MP 1670
[1983, p.199-208] MP 295	Sintering and compaction of snow containing liquid water.	Yaw Air cushion vehicle ground contact directional control de-
Modeling rapidly varied flow in tailwaters. Ferrick, M.G., e al, (1984, p.271-289) MP 171:	Colbeck, S.C., et al, [1979, p.13-32] MP 1190	vices. Abele, G., et al, [1976, 15p.] CR 76-45
SNOW-TWO data report. Volume 2: System performance		
Jordan, R., ed, [1984, 417p.] SR 84-20	Liquid distribution and the dielectric constant of wet snow.	
Snow-Two/Smoke Week VI field experiment plan. Red field, R.K., et al, [1984, 85p.] SR 84-19		
Pulse transmission through frozen silt. Arcone, S.A.	systems. Colbeck, S.C., (1981, 9p.) SR 81-06	
[1984, 9p.] CR 84-1' Electromagnetic pulse propagation in dielectric slabs. Ar	Mechanisms for ice bonding in wet snow accretions on power	
cone, S.A., [1984, p.1763-1773] MIP 199:	lines. Colbeck, S.C., et al, [1983, p.25-30] MP 1633 Wettability	
Forward-scattering corrected extinction by nonspherical per	Seeking low ice adhesion. Sayward, J.M., (1979, 83p.)	
ticles. Bohren, C.F., et al, [1984, p.261-271] MP 1870	SR 79-11 Water and air horizontal flow in porous media. Nakano V	
Discrete reflections from thin layers of snow and ice. Jezek		
K.C., et al, [1984, p.323-331] MP 187: Catalog of smoke/obscurant characterization instruments	Mosture Bull and its morning consequence for common 1001	
O'Brien, H.W., et al, [1984, p.77-82] MP 186		
Attenuation and backscatter for snow and sleet at 96, 140, and		
225 GHz. Nemarich, J., et al, [1984, p.41-52] MP 186	SR 81-31 Wetting fronts in porous media. Nakano, Y., [1983, p.71-	
Analysis of river wave types. Ferrick, M.G., [1985, p.209-	78 ₁ MP 1720	
220 ₁ MP 1879 Weather		
Review of sea-ice weather relationships in the Southern Hem		
isphere. Ackley, S.F., [1981, p.127-159] MP 1426	MP 1544	
Weather forecasting Midwinter temperature regime and snow occurrence in Ger	Wind factors Viscous wind-driven circulation of Arctic sea ice. Hibler,	
many. Bilello, M.A., et al, {1978, 56p.; CR 78-2	W.D., III, et al, [1977, p.95-133] MP 983	
Relationships between January temperatures and the winte		
regime in Germany. Bilello, M.A., et al, [1979, p.17-27] MP 121:	Review of sea-ice weather relationships in the Southern Hemisphere. Ackley, S.F., [1981, p.127-159] MP 1426	
Ice formation and breakup on Lake Champlain. Bates, R.E.	Wind pressure	
[1980, p.125-143] MP 142 Current procedures for forecasting aviation icing. Tucket	model stady of a ore reader to conduct an action, while success	
W.B., (1983, 31p.) SR 83-2	CR 82-09	
Prozen precipitation and weather, Munchen/Riem, Wes Germany. Bilello, M.A., [1984, 47p.] SR 84-3:		